

NETWORK WORLD

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User Excellence Award
entry form
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Newbridge adds packet, mgmt. tools to mux line

By Paul Desmond
Senior Editor

HERNDON, Va. — Newbridge Networks, Inc. last week announced packet-switching capabilities for its T-1 multiplexers and management software that enable users to logically partition Newbridge networks in a variety of ways.

Newbridge announced a suite of products, dubbed Network Products 4, including a new frame relay module that supports as many as six T-1-speed frame relay links. The company also unveiled a low-end integrated Ethernet hub module for its 3600 and 3645 MainStreet multiplexers.

Analysts were most impressed with the network management aspects of the Newbridge announcement. The company unveiled software packages, collectively dubbed Views, that enable Newbridge's 4602 Network-Station net management system to logically divide management of networks according to user criteria.

A local-area network internet, for instance, could be logically
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PHOTO ©1991 MARTIN SIMON

INTELSAT officials John Hampton, Robert Kinzie and David Tudge (l. to r.) plan to keep the organization competitive.

Darkening skies: INTELSAT faces threats to dominance

By Barton Crockett
Senior Editor

WASHINGTON, D.C. — At the pinnacle of the network industry, the International Telecommunications Satellite Organization is looking down on a world of changes that threaten its position as the leading supplier of global network services.

For years, INTELSAT, a non-profit organization based here, has used its vast satellite system to deliver most of the dedicated and switched services for international communications.

But the organization's dominance is being threatened by the proliferation of fiber-optic transmission facilities and the rise of new private satellite service pro-

viders that are winning great latitude to compete in INTELSAT's primary markets.

In a wide-ranging interview last week, John Hampton, INTELSAT's acting director general, David Tudge, deputy director general, and Robert Kinzie, strategic planning director, acknowledged that the organization is at a crossroads. They said major changes, including privatization of INTELSAT, are being examined to ensure the organization remains competitive.

"It's an interesting time," Kinzie said. "No matter where you go, you can find some form of deregulation, privatization and competition. We have to make
(continued on page 7)

AT&T offers up free ISDN to boost usage

Carrier files promotion to waive fees, provide 3 free months of Primary Rate Interface service.

By Bob Wallace
Senior Editor

WASHINGTON, D.C. — In a major push to build interest in its ISDN Primary Rate Interface (PRI) service, AT&T last week announced its most far-reaching ISDN incentives to date, including three months of free service.

AT&T asked the Federal Communications Commission to approve separate promotions for waiving certain PRI fees and to provide limited free usage. The savings could be particularly important to larger customers looking to justify Integrated Services Digital Network services at numerous locations.

The move comes little more than a month after US Sprint Communications Co. said it would waive an installation fee for its PRI service. MCI Communications Corp. has waived PRI installation fees since last fall.

Although AT&T said PRI sales in 1991 have exceeded its expectations, industry watchers said the proposed promotions underscore the difficulty the carrier is experiencing marketing the service to users.

"You don't run a promotion if something is selling well," said

Daniel Briere, president of TeleChoice, Inc., a Montclair, N.J., consultancy. "Offering free ISDN
(continued on page 39)

INSIDE



Bringing Terminator 2 to life. See story, page 2.

Client/server shift tests software cos.

By Timothy O'Brien
West Coast Bureau Chief

While Dun & Bradstreet (D&B) Software and Computer Associates International, Inc. (CA) have made news of late with client/server announcements, analysts question just how successful mainframe software giants such as these will be in moving their product portfolios into the era of distributed computing.

Analysts say companies such as CA, D&B Software and IBM may not be able to keep pace with rapid local-area network migration plans and move past client/server marketing hype to deliver viable products. The challenges these companies face mirror those that large users must overcome in migrating their own applications into the client/server arena.
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NETLINE



NEW INT'L VOICE contract that could save U.S. government millions may be political hot potato. Page 4.

MITEL HAS HIGH HOPES that its new digital PBX line will give it a boost in tough market race. Page 4.

BYTEX'S RISC-BASED matrix switch outperforms current models by 250%. Page 4.

NEWLY FORMED TYLINK acquires Avanti's assets, including its T-1s, muxes, DSU/CSUs. Page 4.

RETIX MAKES FORAY into the token-ring arena with introduction of a local and a remote bridge. Page 6.

UPS TO ENTER int'l telecom services arena, inks equipment deal with DBP Telekom. Page 6.

FEATURE



Speedy optical switches readied for next century

By Salvatore Salamone
Features Writer

The era of electronic switching is coming to an end. If demand for bandwidth continues to climb at its current pace, carriers will have to migrate from electronic to optical switches, probably some time early in the next century. That's likely to be followed by deployment of optical switches on customer premises.

Consider some of the high-bandwidth offerings in the

works today. Metropolitan Fiber Systems, Inc. last month said it will soon provide LAN interconnection services at speeds up to 100M bit/sec. MCI Communications Corp. earlier this year announced that it will provide switched services at 45M bit/sec. And the U.S. government has funded five gigabit-per-second test bed networks.

Although these services are based on electronic switching,
(continued on page 27)

Technologies
of the
future

Wellfleet to offer tools for SNMP management stations

New value-added applications in the AIM strategy will be specifically tuned for managing internets.

By Maureen Molloy
Staff Writer

BEDFORD, Mass. — Wellfleet Communications, Inc. last week announced that it will soon release a set of applications for managing internetworks that work with any Simple Network Management Protocol (SNMP)-based management station.

As part of its new Advanced Internetwork Management (AIM) strategy, Wellfleet will provide users with tools specifically designed for managing internetworks. The tools work hand in hand with a generic central-site SNMP management station used

for controlling an enterprise net.

The company will offer value-added applications that address the five functional areas of the Open Systems Interconnection management model: configuration, fault management, performance, security and accounting.

The applications will work with SNMP-based management stations from vendors such as Hewlett-Packard Co. and Sun Microsystems, Inc., as well as Wellfleet's own SNMP management station, SNMP-NMS.

Wellfleet also unveiled the first application introduced un-

(continued on page 37)

T-1 network helps to bring sound to the silver screen

Innovation lets editors work in different studios.

By Wayne Eckerson
Senior Editor

NICASIO, Calif. — When Arnold Schwarzenegger, the indestructible cyborg in *Terminator 2: Judgment Day*, uttered, "I'll be back," his voice was probably matched with his image across a T-1 circuit during production.

Skywalker Sound, a division of Lucas Arts Entertainment, recently began using its T-1 network to send digitized audio from its Santa Monica, Calif., studio to its main production studio here at *Star Wars* director George Lucas' famed Skywalker Ranch, where the sounds are captured and dubbed into movie sound tracks.

The production company also

has developed a proprietary method for sending control signals across a T-1 line so a sound track being transmitted from one location will remain in sync with a projector running at another location, even with the projector starting, stopping and rewinding.

That function enables movie directors in Santa Monica and film editors here to simultaneously view the same film and discuss changes to the sound track, reducing travel and speeding production.

Skywalker Sound, which has created sound tracks for other major motion pictures, such as *Backdraft*, leased the T-1 circuit

(continued on page 39)

Intel chip woes may delay new superserver models

By Caryn Gillooly
Senior Editor

SANTA CLARA, Calif. — Superserver vendors last week said Intel Corp.'s recent decision to halt shipment of its top-of-the-line microprocessor due to production flaws could slow availability of new systems if the problem is not solved soon.

NetFRAME Systems, Inc. and Tricord Systems, Inc., which are separately developing unannounced products based on Intel's 50-MHz version of its 80486 microprocessor, said if the chip maker doesn't resume shipments soon, they may be forced to revise product plans that could delay shipments.

Late last month, Intel advised its chip customers to suspend shipments of any products based on the 50-MHz 80486, due to a condition the company discovered in testing in which the microprocessor could overheat, causing the system to either hang, automatically reboot or return to the DOS prompt.

"We're definitely affected," said a spokesman for Tricord, based in Milpitas, Calif. The company is still developing the product. The spokesman declined to be more specific about it.

"At this point in time, we're trying to figure out ways to get around the problem — ways to

(continued on page 7)

Briefs

Still time to enter. There's still a chance to be recognized for your innovative networking efforts. *Network World's* editors will begin judging the Seventh Annual User Excellence Awards entries in mid-September, and the deadline for filing entries is Thursday, Sept. 12. To enter, send us a 250-to-500 word abstract describing how your network has helped your organization achieve its strategic objectives. Fill out an entry form on page 38 of this issue, or mail your entry to: Editor, *Network World*, 161 Worcester Road, Framingham, Mass. 01701, or fax it to (508) 820-3467. Don't wait.

Banyan X.500 push. Banyan Systems, Inc. is expected to preview X.500 directory capabilities at the INTEROP 91 Conference and Exhibition in San Jose, Calif., in October, according to sources close to the company.

At the recent SCO Forum91 conference in Santa Cruz, Calif., James D'Arezzo, vice-president of marketing, acknowledged that Banyan was working on X.500 but declined to give any further details. Banyan views X.500 as the facility for interoperability among multivendor directories. Its StreetTalk directory services will be able to share information with any other naming service that supports X.500.

Sources also said Banyan plans to announce support for the Simple Network Management Protocol at INTEROP.

And the winner is . . . The Open Software Foundation (OSF) is scheduled to announce Sept. 17 which vendors' technology has been selected for its Distributed Management Environment (DME), which is the OSF's multivendor network management architecture. David Passmore, a partner at the consultancy Ernst & Young in Vienna, Va., and a member of the DME evaluation team, last week said the OSF selected technology from a number of vendors, although he declined to name them.

The DME will incorporate two basic types of technology — an integration platform and a set of management applications. No single submission was selected in its entirety for the integration platform, which includes application program interfaces and a management information base. And only a few applications will be included in the first release of DME because the OSF expects independent software de-

velopers and other vendors to come up with applications that adhere to DME, Passmore said.

3Com airs adapter strategy. 3Com Corp. last week mapped out a strategy calling for development of customized adapter cards for client and server machines on a local-area network and increased manageability for all future net adapters. 3Com also said it would be developing its own chips for its adapter cards that would not only consolidate existing adapter components, but would also include integrated hardware and software functions.

Eric Benhamou, president and chief executive officer of 3Com, based in Santa Clara, Calif., said that with the growing size and complexity of LANs, it's becoming impossible to reconcile the goals of low cost — important on the client side — and improved performance required for the server side. The company will develop two adapter families based on different chip implementations.

On the management side, 3Com said it would provide Simple Network Management Protocol support on all its cards, as well as support for the joint 3Com/IBM proposed Heterogeneous LAN Management standard.

Benhamou said 3Com also plans to encode software functions and management capabilities into the adapter chip itself. The company will take a similar approach with its internetworking products as well. The fruits of these plans will emerge in the first half of next year. He added that the firm will begin offering Fiber Distributed Data Interface adapter cards within the same time frame.

Bypass market shakeout continues. Metropolitan Fiber Systems, Inc. (MFS) of Oakbrook Terrace, Ill., last week acquired a controlling interest in Institutional Communications Co. (ICC), a Washington, D.C.-based alternative access carrier, from Northern Telecom Finance Corp. and CIT Group/Equipment Financing, Inc. MFS declined to reveal the cost of the arrangement. ICC's network includes almost 200 miles of fiber accessible to users in 550 buildings. The carrier serves 18 federal departments and agencies, over 20 long-haul carriers and a number of other users. The acquisition of ICC by MFS is subject to certain conditions including approval by regulatory agencies.

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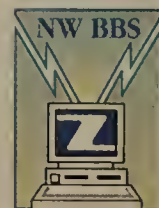
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Feds' int'l voice pact could stir political controversy

By Ellen Messmer
Washington Correspondent

SCOTT AIR FORCE BASE, Ill. — A federal government RFP to supply international voice services to U.S. agencies could become a political hot potato due to a controversial provision that would require carriers to end-run the Federal Telecommunications System (FTS) 2000 contract for the domestic portion of international calls.

By combining the majority of the federal agencies' traffic under the five-year International Switched Voice Services (ISVS) contract, the government expects to save 30% or more over what it pays today for international voice service.

But the Defense Commercial Communications Office (DECCO) here, which issued the request for proposal, included a provision that calls for use of domestic long-distance services outside the realm of the FTS 2000 services provided by AT&T and US Sprint Communications Co. Such a provision may anger Congress, which has recently drawn a hard line on agencies' adherence to the FTS 2000 contract.

It remains to be seen whether Capitol Hill lawmakers, returning

to Washington, D.C. this week after the summer break, will seize this as an issue and become as embroiled in ISVS as they have been in FTS 2000.

Although the contract is targeted for international voice ser-

does not violate FTS 2000 mandatory use regulations.

The ISVS RFP, issued by DECCO on Aug. 20, offers this rationale on why the government has chosen to exclude FTS 2000 under ISVS.

"Neither FTS 2000 services nor their associated facilities may be utilized for originating access in the provisioning of ISVS," the RFP states. It goes on to explain that the universal lack of auto-

Monthly international switched voice usage for 18 federal agencies

Department/agency	Number of minutes
Defense Telecommunications System	459,500
Air Force	147,000
Health and Human Services	120,000
U.S. Information Agency	108,000
Army	81,500
Treasury	80,000
Commerce	50,000
Justice	46,800
Energy	36,000
Agriculture	21,800
Peace Corps	17,000
Transportation	16,500
Smithsonian Institution	14,200
National Science Foundation	5,400
Nuclear Regulatory Commission	4,000
U.S. International Trade Commission	1,800
General Services Administration	1,500
Labor	700

GRAPHIC BY TERRI MITCHELL

SOURCE: DEFENSE COMMERCIAL COMMUNICATIONS OFFICE, SCOTT AIR FORCE BASE, ILL.

vice, ISVS contains a domestic section requiring the winning vendor to connect government callers to the carrier's closest international point of presence.

Agency officials involved in the ISVS procurement contend it

matic number identification (ANI) features at government locations now on the FTS 2000 network would make it "difficult, if not impossible, for a subscriber to verify accurately his [agency's]" *(continued on page 39)*

Mitel tries to rebound with advanced digital PBX line

Modular switches feature ISDN PRI, ANI support.

By Bob Wallace
Senior Editor

KANATA, Ontario — Struggling Mitel Corp. is trying to get back into the thick of the PBX race and into the black with a new line of advanced digital private branch exchanges introduced here last week.

At a daylong meeting at the company's headquarters here, Mitel unveiled the SX-200 Light and SX-2000 Light private branch exchanges, which join its existing SX-200 and SX-2000 models. The modular PBXs can be distributed for use in a campus environment and are the first from Mitel to offer Integrated Services Digital Network Primary Rate Interface (PRI) and automatic number identification (ANI) support.

Mitel said the PBXs will cost less to manufacture, thanks to a corporate reorganization and use of off-the-shelf components that have helped reduce per-unit production costs by 35%. That's good news for Mitel, which lost \$92.5 million in the fiscal year ended March 31 and \$4.7 million in the first quarter of 1991.

"These reductions will enable

us to provide a better product less expensively and help revitalize this company by cutting costs and increasing revenues," said Tony Griffiths, Mitel president and chief executive officer.

Allan Sulkin, president of Teq-Consult Group, a Hackensack, N.J., consultancy, said, "These new products prove that Mitel is not dead. The company is invigorated and moving forward."

In addition to winning new customers — a tough prospect in today's PBX market — Mitel is hoping to give current customers an easy migration path to its new PBXs. Users can retain over 90% of the hardware when they upgrade from an SX-200 to a SX-200 Light, or from the SX-2000 to a SX-2000 Light. However, there isn't a clear migration path between the two new switches.

"We wanted to give our installed base the smoothest migration possible to the [SX-200 Light and SX-2000 Light]," said Tony Bawcutt, Mitel's marketing vice-president. "We don't anticipate much demand from SX-200 Light users for a move to the SX-2000 Light."

Although the Light PBXs are not true distributed systems because switch units cannot operate independently, switching units can be located a little over half a mile from the main control unit and connected using fiber-optic cable, making the switches attractive for use in campus environments.

That capability was not available with the SX-200 or SX-2000, however.

The ability to remotely house switch units is supported in part by new operating software for the PBXs that also provides ISDN PRI support and can work with ANI and Dialed Number Information Services (DNIS) provided by long-haul carriers.

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Bytex intros high-speed RISC switch

By Paul Desmond
Senior Editor

SOUTHBOROUGH, Mass. — Bytex Corp. this week will announce a new RISC-based matrix switch that the company said can perform switching tasks an average of 250% faster than its current models.

Bytex's new Unity 90 Enterprise Network Switch is based on dual Reduced Instruction Set Computer microprocessors that are industrial versions of the chips used in Sun Microsystems, Inc.'s SPARCstation 1+.

The processors, rated at over 15 million instructions per second (MIPS), can execute commands about 250% faster than the custom version of the 0.5-MIPS Motorola, Inc. 68000 microprocessor used in Bytex's ex-

isting high-end Unity 50 matrix switch, said Jerry Miller, senior product manager for the firm, based here.

The Unity 90 will be able to switch data lines faster than previous versions. For example, it takes about 40 seconds to switch 128 ports to a spare front-end processor with an existing switch, but the Unity 90 can do that in eight seconds, he said.

For users, the upgrade will be most apparent when the matrix switch has to change to its backup processor, a process that takes about 20 minutes with the Unity 50 mainly because the integrity of its data bases has to be verified. "That process now happens in 20 seconds," Miller said.

Analysts agreed the move to the scalable processor architecture was a good one. "It's able to handle the internal switching much more efficiently, and subsequently, it can handle traffic [switching] speeds much in excess of the original," said Doug Gold, director of communications research at International *(continued on page 39)*

TyLink takes over Avanti, sets sights on new markets

By Paul Desmond
Senior Editor

NORTON, Mass. — From the ashes of Avanti Communications Corp., which has disappeared in all but name, rises TyLink Corp., a new company based here that has purchased Avanti's assets, including its product line.

TyLink, which plans to announce its formation within the next few weeks, last April acquired Avanti's line of T-1 and point-to-point multiplexers, voice compression multiplexers and data service unit/channel service units (DSU/CSU), said Jack Kelly, vice-president of marketing. Kelly was previously director of marketing for Avanti.

TyLink will sell most of Avanti's products, except its high-end Open Network Exchange line of T-1 multiplexers, and will support existing Avanti customers, Kelly said.

The company will also roll out its own line of products for accessing switched digital services at 56K bit/sec and above, he said.

Steve Taylor, president of Distributed Networking Associates, a consultancy in Greensboro, N.C., said TyLink's decision to focus on lower end products is a good one because the T-1 multiplexer market is competitive and will become even more so in the future.

"It's going to take more than a good T-1 mux; it will take frame relay-type technologies," Taylor said. "You've got to make a significant investment."

Addressing high-speed switched digital services, on the

other hand, "would seem to be a natural evolution for them," he said. In that market, TyLink will compete against vendors of DSU/CSUs, which Taylor said was one of the strengths of the Avanti product line.

As for Avanti, the company still exists as a corporate entity but, having transferred all its assets to TyLink, is left with nothing but debt. The phone at Avanti's

The formation of TyLink was a way for the financially troubled Avanti to start anew.

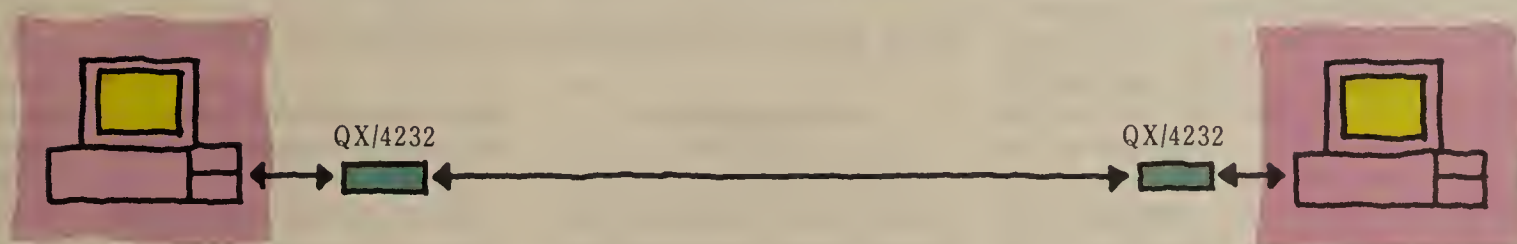
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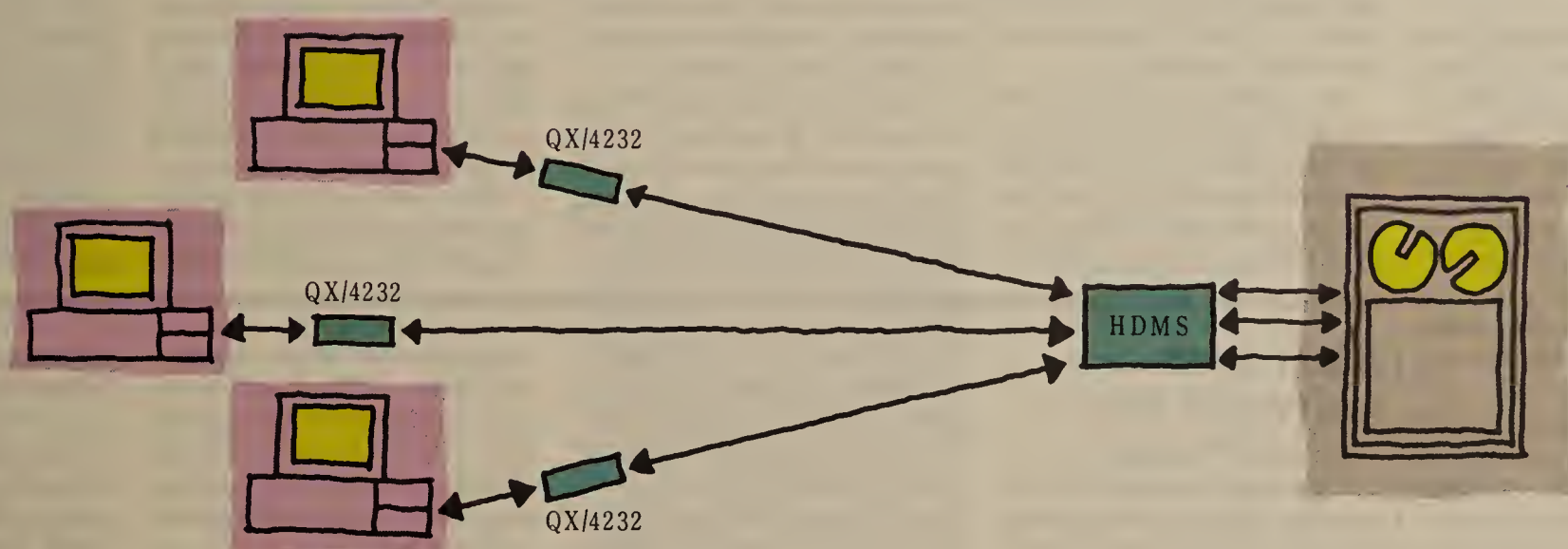
"Avanti went bankrupt, for all intents and purposes," said Rosemary Cochran, principal at Vertical Systems Group, a consultancy in Dedham, Mass. She said the formation of TyLink was a way for the financially troubled Avanti to start anew.

Kelly agreed with the gist of Cochran's assessment, although he said Avanti is not technically bankrupt. Nonetheless, "All of the people who worked for Avanti were offered employment at TyLink, and we own Avanti's assets," he said. ■

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UPS spin-off reveals int'l net strategy

By Barton Crockett
Senior Editor

MAHWAH, N.J. — United Parcel Service of America, Inc. last week revealed plans to form UPS Telecommunications, Inc., a new unit that will provide international private-line, packet switching and enhanced data services to UPS customers and other users.

The company also announced a deal with Deutsche Bundespost (DBP) Telekom to become the first user to collocate equipment in the carrier's central office. DBP Telekom will also provide UPS with network management services.

UPS Telecommunications plans to file tariffs with the Federal Communications Commission within a month to provide international private-line services ranging in speed from 64K bit/sec to T-1, according to Laynglyn Capers, UPS' network services manager. Additionally, the new unit plans to provide electronic data interchange, electronic mail and X.25 packet switching.

UPS Telecommunications will focus on providing services to UPS' package delivery customers. Capers added, however, that other companies could also obtain services from UPS Telecommunications.

UPS Telecommunications will deliver network services via UPS-Net, UPS' global private network. Capers declined to say how much UPS Telecommunications will charge for network services. But he said the unit's rates will be competitive with the lowest rates now available.

Douglas Fields, UPS' telecommunications manager, said UPS is not planning to make a significant profit from its network business. Instead, the company wants to bolster its relationship with customers by helping them set up global networks.

DBP Telekom deal

Equipment collocation services from DBP Telekom will help UPS better accommodate its rapidly expanding European business.

UPS signed a multimillion-dollar contract to house Northern Telecom, Inc. DPN100 packet switches and a Network Equipment Technologies, Inc. multiplexer at a DBP Telekom central office in Frankfurt, Germany. DBP Telekom will maintain the equipment and monitor the portion of UPS' European network hubbed through the Frankfurt node.

According to Donald Hassenbein, vice-president of DBP Telekom's U.S. subsidiary, DBP Tele-

kom, Inc., the German carrier has never before provided equipment collocation and network management services to a multinational company. But he said several users are interested in the service.

UPS will pay less for collocation and network management services from DBP Telekom than the company would pay to hire one full-time professional to maintain the equipment and manage the European network, Capers said.

UPS can collocate equipment with DBP Telekom faster than it can hire its own staff, he said. This is important since UPS' European network is growing rapidly.

When the Frankfurt hub is installed later this year, UPS plans to cut over one T-1 circuit that will link that hub to UPS' data center here. A 768K bit/sec circuit will run from the Frankfurt hub to one in London, which is housed in British Telecommunications PLC's facilities.

The London hub will be linked via a T-1 line to the UPS data center here. Both the London and Frankfurt hubs will be linked via 64K bit/sec circuits to UPS offices in 28 European countries. □

Retix serves up local and remote token-ring bridges

Also airs DOS-based net manager for bridges.

By Maureen Molloy
Staff Writer

SANTA MONICA, Calif. — Retix last week entered the token-ring market with a local and a remote bridge, each capable of supporting 4M and 16M bit/sec token-ring local-area networks.

The company also announced its 311 Token Ring Bridge Manager, a DOS-based network management center to manage the token-ring bridges.

Until now, Retix supplied only Ethernet bridges. According to Jennifer Pigg, a senior analyst at The Yankee Group in Boston, the company's entry into the token-ring market will allow customers to obtain low-end internetwork gear from a single vendor.

The 3660 Token Ring Bridge Manager is a two-port stand-alone device that provides local bridging between two 4M bit/sec token-ring LANs, two 16M bit/sec token-ring LANs, or between one

4M and one 16M bit/sec ring. It has a packet forwarding rate of up to 1,600 packet/sec.

The 3880 Token Ring Bridge Manager also is a two-port stand-alone bridge used to connect token-ring LANs over wide-area networks. It supports one 4M or 16M bit/sec token-ring port as well as one wide-area network port that can support speeds up to 2.048M bit/sec. It can forward data up to 1,600 packet/sec.

Both the 3660 and 3880 support the IEEE 802.5 source routing protocol standard for transferring frames. Both also work in conjunction with IBM's source routing bridges and LAN Manager. In addition, the two products will work with Novell, Inc.'s source routing NetWare, as Novell now supports source routing in current releases of NetWare.

The 3660 and 3880 bridges are priced at \$5,850 and \$6,450, respectively, and will be available

by the end of the month.

The 3660 local bridge competes with Andrew Corp.'s Bridgeport/7606, which is also configurable for either 4M or 16M bit/sec token rings and works cooperatively with IBM source routing bridges and LAN Manager. Both are comparably priced; the Andrew bridge costs \$5,000.

The 311 Token Ring Bridge Manager is software that operates on an IBM-compatible personal computer that enables LAN administrators to configure local and remote bridges from a central workstation. It provides direct local bridge configuration via a serial port or inband management of all token-ring bridges on the net.

The 311 Token Ring Bridge Manager monitors the bridges either through direct connection to the bridge or inband using the IBM LAN Manager. It supports network management capabilities such as bridge configuration, fault handling and compiling statistics.

The 311 Token Ring Bridge Manager is priced at \$495 and will also be available by month's end. □

Shift tests software cos.

continued from page 1

"It's like moving dinosaurs into the age of open systems," said Rikki Kirzner, senior industry analyst at Dataquest, Inc. in San Jose, Calif.

CA and D&B Software have outlined plans to develop client/server applications that off-load tasks such as data entry from hosts to LAN-based workstations. But IBM has been quiet on how — or whether — it will migrate its vast portfolio of host applications to client/server configurations.

IBM maintains that mainstream information systems management is just not ready to chop out the mainframe infrastructure in large-scale production applications.

"It is difficult to take large monolithic programs and arbitrarily split them up," said Marty Vernick, manager of the client/server technical office at IBM.

Vernick said IBM is relying heavily on its software development partners to provide new client/server applications.

"In terms of IBM applications, I don't have much of a story to tell," he said.

According to Vernick, IBM is focusing on providing the infrastructure — meaning the integrated hardware platforms, operating systems, management and development tools — through avenues such as Systems Application Architecture to enable developers and customers to write distributed applications.

Analysts point out that IBM or any mainframe application de-

veloper will face problems in moving existing host applications into a distributed environment.

Thomas Willmott, vice-president of Aberdeen Group, Inc., a consultancy in Boston, says developing client/server applications is not as simple as off-loading some processing to a LAN. "You have to rewrite because when you off-load processing to the LAN, you've just nuked the mainframe application," he said.

Observers say IBM still has a long way to go to provide the infrastructure to support distributed applications.

Rick Villars, director of networking architectures at International Data Corp. in Framingham, Mass., said he believes it will be at least 1993 before users will have the development and management tools needed to make client/server applications a reality.

"IBM is posturing; they're marketing a concept before there is any product," Villars said.

But IBM's Vernick maintains that users aren't in a rush to move applications off mainframes because LANs still can not offer mainframe-type security, management and reliability.

On the horizon

A survey released by D&B Software in July showed that 60% of its customers viewed client/server as a promising concept and said they were ready to deploy practical applications in the next year or two.

Shortly thereafter, D&B Software announced it would develop a new generation of LAN-based applications designed to work with its host software. The com-

pany, one of the largest providers of finance, human resources, manufacturing and other applications, said the applications would offer functionality that could no longer be cost-effectively provided on the host.

John Landry, D&B Software's chief technology officer, said the company will make an incremental migration to this new generation of applications so that customers can maintain their investments in host-based software. Some of the new software may show up by year end.

But analysts believe it will take longer for the company to deliver on its promises. They say D&B Software will undoubtedly be playing catch-up with smaller companies that have a head start in the client/server arena.

"It's still a question whether or not customers will want D&B with their architectural luggage or simply turn to a new class of LAN applications," said Aaron Zornes, vice-president of the META Group in Westport, Conn.

According to Zornes, the firm has to deal with current technical challenges, such as migrating its host applications to IBM's DB2, as well as the architectural changes taking place at user sites. "There are new customers that don't want a mainframe solution any more," he said.

Striving for cohesion

CA has taken a somewhat different road to distributed computing with its "CA90s: Computing Architecture for the 90s" plan. The approach is designed to bring cohesion to the many product lines the company took in by

acquiring competitors such as Cullinet Software, Inc. and Software International, Inc.

One key thrust for CA is to make its software available on a variety of hardware platforms, which would allow the products to work together across the net.

"Our application architecture enables us to migrate applications to all different platforms, which is helping us and our clients get to distributed processing more quickly," said Ron Nunn, senior vice-president of research and development for CA.

CA is providing business applications, as well as software for integrated systems management, data base management and application development on as many as 30 different platforms, from mainframes to desktop computers. But the company is also getting in on the client/server push by announcing some new applications that will run, in part, on hosts and LANs.

For example, a portion of its recently announced Masterstation financial applications will run on LANs and interface with mainframe software. Those applications are scheduled to go into beta test this fall.

But before making any move into the client/server arena, analysts said CA must tackle the daunting job of integrating its current catalog of software. Like D&B Software, which is also trying to integrate applications that it acquired from other companies, CA is unlikely to be a leader in the new marketplace.

"Look for CA to be trailing, rather than leading, this charge," Willmott said. □

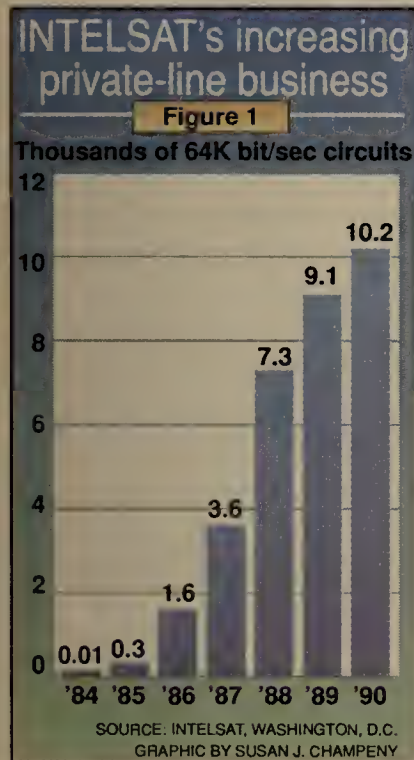
INTELSAT faces threats

continued from page 1

sure we can coexist with this and gain our portion of the pie."

Fiber threat

INTELSAT was created in 1964 as a government initiative to improve global communications facilities. Currently, 121



countries own a portion of INTELSAT and abide by the international treaty that governs the organization's operations.

INTELSAT typically serves monopoly carriers and other organizations that resell services to carriers and users.

Although INTELSAT was considered critical at its inception, its importance has diminished in recent years as new means of international communications have emerged.

Perhaps the most important of these are international fiber cables. Since the first cable went online in late 1988, international fiber links have proliferated throughout the world, becoming a favorite of users who like the transmission quality.

"Whenever a user has a choice between using fiber [or satellite]

between two points, fiber is almost always preferable," said Leonard Elfenbein, president of Lynx Technologies, Inc., a consultancy in Little Falls, N.J., that helps users manage global networks.

By mid-1991, users were leasing more private-line bandwidth on fiber cables than on satellites, according to MarTech Strategies, Inc., an international network market research firm in Indianantic, Fla.

Meanwhile, INTELSAT's international private-line sales were one of the fastest growing segments of its business in the 1980s. But last year, this growth slowed (see Figure 1, this page).

Switched services, which make up the majority of international traffic, are also increasingly flowing over international fiber cables. Currently, AT&T routes about half of its international telephone calls over satellite facilities, compared to roughly 60% in the mid-1980s.

These changes threaten INTELSAT's revenue base. Last year, the organization received 60% of its \$614 million in revenue from international switched services and nearly one-tenth of its revenue from private-line services (see Figure 2, this page).

Fiber-optic cables will become an even greater threat in the future as provisioning costs decline and availability increases.

INTELSAT officials concede that fiber will take market share from them and that the cost of fiber services is falling faster than the cost of satellite services. But they say satellite is still less expensive than fiber and will continue to play a major role in user networks.

"There is a real place in the world telecommunications net for satellites," Hampton said. "They offer a lot of advantages."

For example, Hampton said an international voice-grade circuit can be provisioned over INTELSAT's latest generation of satellites for about a third of the cost of the same circuit over Trans-At-

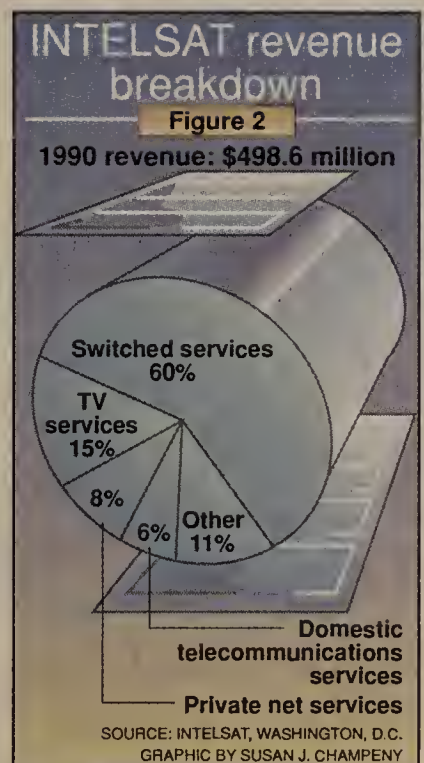
lantic Telecommunications-8, one of two fiber cables linking the U.S. to Europe.

He added that fiber service providers must pay to route traffic from the point where a submarine cable hits land to a carrier switching facility. INTELSAT can minimize costs by deploying earth stations adjacent to carrier switches or on users' premises.

INTELSAT can also provide satellite service to nearly every country in the world. Only a handful of countries are served by fiber cables, and the majority of developing countries may not have international fiber services for years, if ever.

INTELSAT has been working to minimize the loss of market share by slashing prices in return for long-term commitments. Previously, INTELSAT only offered monthly contracts without volume or term discounts.

These tariffs enable a customer leasing bulk capacity with a 15-year commitment to get a dedicated voice-grade circuit for \$27 a month, according to Kinzie. INTELSAT now receives 55% of its



traffic from customers with 10- to 15-year commitments.

INTELSAT is also working to replace analog satellite services

with higher quality digital services. For example, 14% of INTELSAT's international switched traffic is now carried over digital facilities, but the organization expects this figure to double within five years.

The organization faces increasing threats from other satellite service providers as regulatory restraints on competition are reduced. For example, late last year, INTELSAT approved new policies that essentially let any private satellite system with less than 30 36-Mhz transponders compete freely as long as it provides fewer than 100 international switched circuits.

Rivals in the wings

Alpha Lyracom Pan American Satellite Corp. (PANAMSAT) has petitioned the Federal Communications Commission to go further by eliminating all restrictions on the provision of international switched services by private satellite systems. If this restriction is dropped, PANAMSAT could become INTELSAT's first full-service satellite rival in the U.S.

But INTELSAT officials say they are not worried about competition. Kinzie said INTELSAT's system is so large that no other satellite company will ever be able to rival its coverage.

INTELSAT currently operates 16 satellites covering nearly every country in the world. PANAMSAT, by contrast, only has one satellite in orbit.

INTELSAT officials added that the company can provide service less expensively than other satellite companies because INTELSAT benefits from greater economies of scale.

"We believe that we have one of the most efficient systems

around," Kinzie said. "As a matter of fact, every system that takes a run [at us] can't meet our efficiencies or our service."

But INTELSAT officials have enough concern about the future to consider some radical reorganization proposals. One restructuring plan being studied involves privatizing INTELSAT by issuing stock. This step could free INTELSAT to compete on a for-profit basis like other carriers.

INTELSAT expects to conclude

its privatization study within six months. Any decision to move in this direction would be made by INTELSAT's owners, which could reap windfall profits from privatization.

Privatization could also make INTELSAT more competitive by freeing it from the obligation to provide services on an equal basis to all its member countries.

But Hampton, Kinzie and Tudge said they believe privatization would be bad. They cautioned that a privatized INTELSAT would be subject to restrictive regulations that affect private companies but not non-profit entities such as INTELSAT.

Instead, the three executives say INTELSAT can compete best by continuing to cut prices and roll out new services.

"I see us basically steering the same sort of course [that INTELSAT has taken since 1989]," Tudge said. "We will be competitive by providing efficient service and pulling our prices down."

This approach should be sufficient, they argue, to prosper in an industry that is growing rapidly.

"We're not in the buggy whip industry," Kinzie said. "We're in the right industry, and the question is, how do we get and keep our share?" ■



PHOTO ©1991 MARTIN SIMON
Robert Kinzie

Chip may delay superservers

continued from page 2

work around it for a month or two," he said. However, problems of this nature often tend to take as many as four months to solve, he added.

If Intel can remedy the problem within two months, Tricord should be able to make its schedule. "But past that, we just can't substitute other work. At that point users will see changes in our development, announcement and marketing cycles," he said.

According to Tom Glassanos, director of marketing for NetFRAME, based in Plymouth, Minn., his company had also been working with the chip for its next

product releases.

"The next performance level is an inherent part of our product strategy," he said. "We've been working on product development using that chip. We had a product introduction planned but not an actual date."

Glassanos said NetFRAME "will not introduce the product into the mainstream until the [80486 50-MHz] technology is proven and the product is known to be solid."

Cause a mystery

An Intel spokeswoman said the chip maker is not yet clear whether the overheating is caused by a design flaw or is due to testing abnormalities, resulting in Intel shipping chips that didn't meet design specifications.

The spokeswoman said Intel has determined that existing testing procedures did not catch a batch of chips that did not meet heat sensitivity specifications.

The few vendors that have shipped products with the 80486 50-MHz microprocessor are predominantly personal computer suppliers. Dell Computer Corp., for example, has been shipping personal computers with the chip since June. IBM and Compaq Computer Corp. have both promised systems that include the chip, but neither has shipped its product yet.

Compaq, although also a superserver vendor, said it does not plan to use the chip in its server line, but rather planned to release a high-performance desktop system — the Deskpro 486/

50L — in the third quarter this year.

"We were ready to ship [the 486/50L] about a month ago, but

"We were ready to ship about a month ago, but we captured the problem in testing."

▲▲▲

we captured the problem in testing," said a Compaq spokesman.

He declined to speculate on whether Compaq would meet its third-quarter ship schedule.

According to the Intel spokeswoman, the company is currently working on a new set of tests that will catch the problem and weed out the chips that do not meet design specifications.

Should the problem continue after these steps are taken, the chip maker may be forced to probe and correct for a design flaw.

She added the company expects the next round of testing to be completed "very soon," although she declined to be more specific.

Both analysts and vendors showed healthy skepticism. "I don't think this will hold them up for too long," said one analyst who requested anonymity. "But we've all heard that 'very soon' story before." ■

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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

“To be successful, OSI has got to come for free with the operating system. Users didn’t buy TCP/IP; they bought Unix, and it had TCP.”

John McQuillan
President
McQuillan Consulting
Cambridge, Mass.

Avatar bolsters Mac-to-host line with Tri-Data buy out

Gains support for PC clients with NetWay line.

By Ellen Messmer
Washington Correspondent

HOPKINTON, Mass. — Avatar Technologies, Inc. recently said it has signed an agreement to acquire Tri-Data Systems, Inc. in a move designed to strengthen Avatar’s role in tying Apple Computer, Inc. Macintoshes into corporate networks.

Avatar said the merger of its product lines with Tri-Data’s will create the industry’s broadest range of Macintosh-to-IBM mainframe connectivity products from a single vendor. Specific terms of the deal were not disclosed, although Avatar said the acquisition will be a cash transaction.

Both companies offer IBM 3270 gateways, but each product line is focused on a different facet of the Macintosh-to-mainframe market. The acquisition enables Avatar to pick up Tri-Data’s NetWay line of Macintosh-to-IBM gateways. Unlike Avatar’s MacMainFrame gateways, which are coaxial boards that reside in a Macintosh, the NetWay line is a series of Reduced Instruction Set Computer (RISC) external gateways that support DOS-based personal computer clients in addition to Macintoshes.

The Tri-Data NetWay 2000 and NetWay 1000 external gateways provide Synchronous Data

Link Control, RISC-based, high-performance connectivity to the IBM 3270 mainframe for Macintosh personal computers.

Tri-Data also brings with it a number of Ethernet network interface cards, routers and an AppleTalk-to-Transmission Control Protocol/Internet Protocol gateway that Avatar previously did not offer.

According to Tom Bogan, president and chief executive officer of Avatar, it was logical to combine both the product lines and networking expertise of the two companies. He said the merger, planned for completion by mid-September, would provide users with one-stop shopping service.

Bogan emphasized that Avatar’s strategy is to provide a full spectrum of IBM 3270 connectivity products based on features and price ranges.

Avatar plans to retain the Tri-Data name and NetWay product line of IBM 3270 mainframe gateways for Macintoshes.

The merger may result in some layoffs, the details of which will be made available after the transaction is completed. Bogan said Bobby Johnson, president and chief executive officer of Tri-Data, will continue working with Avatar in a consulting role. ■

INDUSTRY BRIEFS

Equifax taps MCI for 800 service. Equifax, Inc. of Atlanta last week said it has signed MCI Communications Corp. to a five-year, \$10 million contract to provide advanced 800 services for the Equifax Information Service Center, which begins operations this December as the national hub for Equifax consumer credit reporting.

Under the contract, MCI will provide a single 800 number to be advertised nationally for consumers to contact and receive credit information. The agreement also calls for MCI to later provide Integrated Services Digital Network services at the center, which plans to employ 500 consumer information consultants.

Rockwell completes sale of unit. Rockwell International Corp. last week said it has completed the sale of its Network Transmission Systems Division (NTSD) to Alcatel Network Systems, Inc. for \$625 million in cash and the assumption of certain related liabilities.

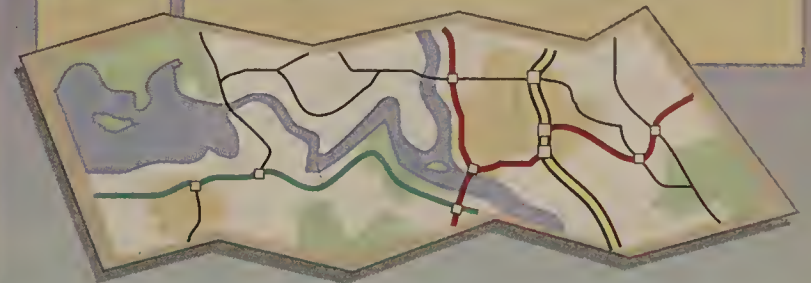
Rockwell announced its intention to sell the unit to Alcatel on July 12. The sale was finalized following the completion of required regulatory reviews. Rockwell said that it would initially use the proceeds of the sale to reduce certain short-term debt.

NTSD is a supplier of telecommunications systems and products for the transport and management of voice, image and data traffic. It reported sales of \$439 million in the company’s

(continued on page 12)

OSI/NM Forum’s Open Management Roadmap

- | | |
|------------|---|
| April 1991 | OSI/NM Forum announces project to consolidate different net management specifications, base standards and conformance tests into a single coordinated plan. |
| Mid-1991 | Forum launches discussions with other industry groups, such as the Open Software Foundation, in attempt to agree on net management objectives. |
| Late 1991 | Forum to define OMNIPoints, which will incorporate standards, other specifications and conformance tests from multiple sources. |
| Mid-1992 | First OMNIPoint to be released. |



OMNIPoints = Open Management Interoperability Points
GRAPHIC BY SUSAN J. CHAMPENY SOURCE: OSI/NETWORK MANAGEMENT FORUM, BERNARDSVILLE, N.J.

Net mgmt. forum eyes single blueprint

OSI/NM Forum leads industry’s rally to commit to integrated network management standards.

By Bob Brown
Senior Editor

BERNARDSVILLE, N.J. — The Open Systems Interconnection/Network Management Forum has begun detailed talks with other industry groups to develop a long-range integrated network management blueprint, according to forum officials.

The forum’s Open Management Roadmap project is designed to help vendors bring interoperable net management products to market sooner by giving them stable standards-based guidelines by which to build their products.

The strategy could be a boon to users by creating a stable set of standards for both network and systems management that ensure products are interoperable. It could also assure users that products developed according to the specification are stable, forum officials said.

The forum is holding discussions with industry and user groups, such as the Corporation for Open Systems International, National Institute of Standards and Technology (NIST), the Open Software Foundation and the forum’s own User Advisory Council, to pool their collective work on network management under the project.

The forum is also attempting to eliminate any duplication of efforts by the various groups in areas such as managed object definitions — those descriptions within network management sys-

tems of the devices to be managed.

“We’re getting strong buy ins from vendors and users on Roadmap,” said Bill Gilbert, the forum’s president and AT&T’s director of network management. “Roadmap is in sync with the way people want to use network management systems more so than the way the normal standards and consortium process leads to getting products built.”

“Roadmap is the number one project we are working on right now,” said Beth Adams, the forum’s managing director.

Roadmap, which the forum announced in April, will be used to match user network management requirements at specific points in time with the standards, conformance tests and specifications available that meet those needs.

This collection of final and draft standards, specifications based on standards and conformance tests will be called Open Management Interoperability Points (OMNIPoints). They will serve as network management technology implementation guidelines for vendors and will be issued approximately every two years.

Forum members are hopeful the basic content to be included in OMNIPoints will be decided upon by year end, said Keith Willetts, the forum’s chairman.

While Willetts referred to the forum’s Release 1 interoperable

(continued on page 12)

People & Positions

The El Paso Natural Gas Co. recently appointed **Richard Fleager** to the post of vice-president of information systems (IS). Previously, he was director of IS at the firm. In his new position, Fleager will be responsible for all computer operations, applications development and support.

Telebit Corp. last week said it has appointed **Michael Papesh**, formerly director of international operations at Telebit’s Sunnyvale, Calif., headquarters, to the position of managing director of Telebit Network Technologies in Luxembourg. He will be responsible for Telebit’s business development activities in Africa, Europe and the Middle East. Prior to joining Telebit in 1989, Papesh was Western regional manager in the international division of Cable & Wireless PLC.

Network Management, Inc. (NMI), an integrator of local- and wide-area networks, recently said it has named **Herbert Klein** as chief technology officer.

In the newly created position, Klein will oversee development of the company’s technical strategy and quality assurance programs. He was formerly general manager of NMI’s Network Management Service Center and managed a host of domestic and international projects for the Corporation for Open Systems International, while he served there as director of research and development. ■



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Worth Noting

Metropolitan Fiber Systems, Inc. President Royce Holland estimated that his firm spent more than \$1 million to develop and deliver from its Houston network the carrier's new line of fiber-based LAN interconnection services.

Carrier Watch

Pacific Bell recently introduced a new discount plan that could save more than \$750 a month for businesses with a high volume of toll calls.

The carrier's Optional Discount Plan offers a 35% discount off toll bills of more than \$3,000 a month. Lesser discounts apply for bills below the \$3,000 threshold.

The plan, designed to keep existing customers from switching to rival carriers, costs \$250 a month.

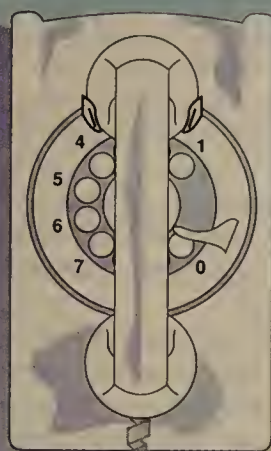
"As competition intensifies in the local telecommunications market, we are responding with strategies to keep the loyalty of the high-end businesses that are the prime targets of long-distance carriers and private bypass system operators," said Gene Sherman, Pacific Bell's national accounts vice-president and general manager.

AT&T last week announced a three-year, \$2.1 million contract to build Okidata a 65-site Software Defined Network (SDN) linking Okidata, Oki Semiconductor Group and Oki Telecom Group locations in the U.S.

Okidata's U.S. divisions had used a variety of services from several carriers.

"We selected AT&T to standardize our corporate network because it offers both cost and convenience advantages for us," said Greg Palmer, Okidata's telecommunications manager. ■

Rotary phones just won't go away



The still widely used rotary telephones are spelling trouble for businesses that have developed automated attendant and voice response applications requiring callers to input digits in order to access information or reach employees.

GRAPHIC BY SUSAN J. CHAMPENY

Percentage of residences with rotary phones

Carrier	Percentage of residences with rotary phones
RBHC	
Ameritech	44.3%
Bell Atlantic Corp.	37.1%
BellSouth Corp.	38.3%
Nynex Corp.	41.5%
Pacific Telesis Group	27.3%
Southwestern Bell Corp.	41.3%
US West, Inc.	38.3%
Average	38.5%

SOURCE: ADVANCED TELECOM SERVICES CORP., WAYNE, PA.

Industry waits for FCC to clarify Tariff 12 ruling

Rivals fear AT&T will get around new restrictions.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — The fate of a number of users seeking changes to existing Tariff 12 deals or awaiting approval for custom network arrangements remains in doubt this week as customers and carriers wait for the FCC to issue further details about its recent decision restricting the use of Tariff 12.

On Aug. 1, the Federal Communications Commission ruled that AT&T has a significant ad-

For example, AT&T filed a tariff proposing eight new changes to Option 36, a deal filed in 1990 for Metropolitan Life Insurance Co. The changes include the addition of authorization codes for certain calls, modifying the international and data line volume discounts and altering outage credit provisions.

Not only are revisions to existing Tariff 12 deals in doubt, but the fate of three new Tariff 12 options are also in question.

Options 90, 91 and 92 were filed but not approved by the FCC by Aug. 1. The FCC has asked for more time to study the deals, and AT&T deferred their effective date from Aug. 14 to Sept. 13.

Some FCC staffers say a special exception will be made for those customers, but AT&T rivals claim the deals must be thrown out.

Objections to exceptions

MCI Communications Corp. has filed a protest against Options 90, 91 and 92.

"[The FCC] must decide whether it can allow legally objectionable offerings to take effect after it has found those offerings to be unlawful, on the premise that they were proposed before the determination of illegality [on Aug. 1]," the carrier stated in its filing.

If the FCC does forbid major changes to existing deals, customers may have other options they can pursue. Since the commission also gave AT&T permission to provide services through

(continued on page 12)

Users of microwave mixed on PCN ruling

Some concerned about FCC decision to require further frequency-sharing tests in 2-GHz band.

By Bob Wallace
Senior Editor

HOUSTON — Private microwave users are expressing mixed reactions to a recent Federal Communications Commission ruling stemming from the nation's first frequency-sharing test involving microwave and personal communications network (PCN) technology.

In May 1990, the FCC issued PCN America, Inc. an experimental licence to conduct a test of its PCN service in the 2-GHz band to determine whether the proposed offering would interfere with existing private microwave systems.

Both users and PCN America acknowledged that PCN signals interfered with microwave radio transmissions. The wireless service company said it would install special filtering and power equipment to address the problem.

But after reviewing test summary reports from PCN America and the Houston Area Microwave Users Group (HAMUG), the FCC said the tests were inconclusive and ordered PCN America to conduct further trials of its spread-spectrum system.

That action has caused con-

cern among some users.

"I'm in a quandary," said George Terry, a network manager at Tenneco Corp., based here. "I thought the testing was over and we'd have a decision from the FCC on frequency sharing."

Terry, who helped coordinate the test, added that retesting may be difficult. Microwave links constructed for the test have been dismantled, and loaner equipment has been returned to the vendors that provided it.

HAMUG members had said frequency sharing was at the very least impractical, if not impossible, and had hoped the FCC would prevent PCN America from using the band.

"I think the [ruling] will slow PCN America down, but I don't think it will stop them," Terry said.

However, some users applauded the FCC's decision to restrict PCN America from moving forward with plans to conduct a full market test of its proposed service, which would enable users to place and receive voice calls from a wireless pocket telephone.

"I find the FCC's decision preventing PCN America from mov-

(continued on page 12)

WASHINGTON UPDATE

BY ANITA TAFF

AT&T plans for new sales promotions. AT&T last week told the Federal Communications Commission that it wants to kick off a slate of promotions for six services targeted at businesses. The carrier said that on Sept. 9, it wants to begin offering a variety of credits and waive some installation charges in order to attract new customers to its Megacom, Pro WATS, 800 Readyline, College Connect Calling Service, Plan D Service and Small Business Option.

All of the promotions require customers to switch from a rival carrier between Sept. 4 and Dec. 4 of this year. Exact dates vary by service, but users must request installation in December or January 1992 to qualify for the promotions.

For new Megacom users, AT&T is offering to waive the nonrecurring service establishment charge per recorded telephone number and to give a choice of credits.

The promotion for Pro WATS is similar. AT&T will waive the service order charge for each new account, reimburse customers a total of \$5 for the local carrier change charge and provide a one-time credit of 100% of the customer's charges for March 1992.

The new 800 Readyline promotion would provide a onetime credit, as much as \$30, for the first full month of billing for new customers and a onetime credit equal to the first full month of billing for existing 800 Readyline customers that order new access lines under the promotion. Promotions for the other three services involve similar credits and installation fee waivers. ■

Users mixed on PCN ruling

continued from page 11

ing immediately into a full market test reassuring," said Rick Smith, a network manager with Texaco, Inc. in Bakersfield, Calif., and chairman of the American Petroleum Institute's (API) Microwave and Satellite Communications Committee. "It seems technical [issues] aren't being completely ignored in favor of promoting new technologies at any cost."

"[FCC Chief Engineer Thomas] Stanley took the only approach he could," said James Merrick, vice-president of telecommunications for Union Pacific Railroad in Omaha, Neb. "Before you accommodate someone who says, 'I can make this technology work,' there better be pretty conclusive evidence that what is proposed is feasible."

Implying legitimacy

One user said the FCC has confused the issue by issuing test licenses to PCN vendors that claim their services can coexist with private microwave nets.

"A number of applicants have suggested that they have a practical way to share the frequency band between [personal communications service] and private microwave," said Texaco's Smith. "The sheer number of those claiming spectrum sharing is practical, together with the implied legitimacy associated with the commission's grant of experimental licenses, has created a bit of a false hope that this noble objective is practical."

Recent comments made by Pacific Telesis Group seem to lend credibility to Smith's belief that sharing is impractical.

Last week, the regional Bell

holding company reported to the FCC that, based on its own technical trials, spectrum sharing would likely cause significant interference with existing microwave users in the band.

Smith agreed. "The reality seen by those of us who are close to the problem is: Sharing can work, but it isn't very practical when one considers the PCS capability lost by having to protect microwave and operate in its presence," he said. "This forces the commission back to reality. There will be a cost involved with displacing an existing service to clear a range of frequencies for PCS use."

API, a Washington, D.C.-based association of petroleum compa-

of substantial economic incentive," he said.

Others expressed interest in Merrick's buy-out suggestion.

"There are quite a few users who would be amenable to the buy out approach," said Texaco's Smith. "It would certainly be a better option than being kicked off the band."

David Hoxworth, a network manager for Marathon Oil Co., said private microwave users should be allowed to auction their radio frequency licenses to the highest bidder. The FCC has said it is considering auctioning the licenses it holds.

"I think it's a sound idea, but I don't see the FCC giving us that kind of latitude," he said.

"There are quite a few users who would be amenable to the buy out approach," said Texaco's Smith. "It would certainly be a better option than being kicked off the band."



nies, estimates it will cost \$300 million to relocate its members with microwave networks to another frequency.

Some microwave users suggested that PCS companies foot the bill for any microwave relocation or shift to another transmission media. "The people who want to use the 2-GHz [band] should buy out the people that have it," said Union Pacific's Merrick. He pointed out that a move would obsolete the 6,000 path miles of 2-GHz microwave that the company operates.

"We're not going to make that kind of move without some type

Hoxworth said his company wants to be reimbursed for the cost of any frequency relocation. "It's just not fair for us to bear this financial burden," he added.

Although PCS is on the minds of countless microwave users, the issue has not yet reached upper management.

"This whole mess hasn't really hit management at the highest level, at least within our company and probably not at other major companies," Smith said. "And it hasn't hit the decision makers in state and local governments. When it does, something's going to hit the fan." ■

Group slaps FCC with suit on Nynex overcharge case

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — A coalition that includes two New York state agencies has taken the Federal Communications Commission to court over its decision to dispense with an overcharging case against Nynex Corp. through private negotiation rather than legal means.

The New York State Department of Law and the New York State Consumer Protection Board, along with Allnet Communications Services, Inc. and Scott Rafferty, a former Nynex employee, recently asked the U.S. Court of Appeals for the District of Columbia to review the FCC's handling of the overcharging issue.

Last February, the FCC ruled that Nynex deliberately violated regulations by using an unregulated subsidiary to drain off profits from its regulated telephone operations. The agency said Nynex forced its own telephone units to purchase equipment and services at inflated prices — some hiked by as much as 1,000% — through its subsidiary Materiel Enterprises Co. Nynex kept the profits.

Initially, the FCC fined Nynex

\$1.4 million, the maximum penalty available, according to agency officials. But the FCC shocked some observers in October when it completely changed course and signed a consent decree with Nynex that allowed that carrier to make a tax-deductible contribution of \$1.4 million to the U.S. treasury in lieu of a fine and relieved the carrier of any admission of wrongdoing.

A number of parties, including the two New York agencies, have asked the FCC to reopen the Nynex case, citing new evidence they believe would force the agency to reconsider releasing Nynex from admitting responsibility.

However, when the FCC decided not to reopen the case, the four parties decided to take the agency to court. The parties claim that, among other things, the FCC violated its own rules in agreeing to hold private negotiations with Nynex that led to the consent decree.

The FCC is governed by ex parte rules, which prohibit interested parties from discussing an open proceeding with FCC officials prior to the release of an order. ■

Forum eyes single blueprint

continued from page 9

network management specification as essentially being OMNI-Points 0.0, he said the first official OMNI-Points will likely be released about mid-1992, coinciding with the forum's Release 2 interoperable network management specification.

"All of the different industry organizations issue their own standards, profiles and specifications at different points in time, making it difficult for vendors to implement them all," Willetts said. "By freezing the specs at certain points in time, the Roadmap gives the vendors a chance to incorporate a consistent set of standards and specifications."

The freezing of a set of specifications for a length of time is similar to the strategy taken by the North American MAP/TOP Users Group in freezing the Manufacturing Automation Protocol standard in the 1980s. That move assured users and vendors that the technology had matured and was a safe investment because it would not change overnight.

OMNI-Points should help vendors speed the process of bringing products to market and hold down prices. Vendors could build a set series of specifications into their products all at once instead of by the expensive process of adding new standard and specifi-

cation support every few months, Gilbert said.

Products implementing OMNI-Points are expected to be rolled out about a year after each OMNI-Points is issued, Adams said.

Bruce Morrell, chairman of the forum's User Advisory Council, said he is hopeful that OMNI-Points will address the lack of interoperability between OSI network management products and Transmission Control Protocol/Internet Protocol and IBM Systems Network Architecture networks.

"Hopefully, by coming up with these OMNI-Points, the industry will be able to accelerate the development of products," he said. "And hopefully, the focus of that development will be management systems interoperability."

The creation of the Roadmap was, in part, spurred by NIST's release in April of a network management specification called the Government Network Management Profile (GNMP), Willetts said. The GNMP both overlapped and addressed user requirements not covered in the forum's Release 1 specification.

The issuance of GNMP drove the point home to the forum that vendors and users would suffer unless industry organizations worked together. Otherwise, the various groups would wind up duplicating each other's efforts and creating confusion in the market, Willetts said. ■

Industry waits for clarification

continued from page 11

contract rather than through tariff at the Aug. 1 meeting, customers might be able to sign a contract for whatever additional services they need but are unable to get under Tariff 12, according to James Blaszak, counsel for the Ad Hoc Telecommunications Users Committee.

Customers might also be able to take advantage of a loophole in Tariff 12 through which services can be increased without AT&T notifying the FCC.

It recently became public that MCI purchased Option 23 under Tariff 12 to get discounted international switched voice services.

Although Option 23 was a mixed package of services when it was designed for Chemical Bank in 1989, MCI was able to buy the deal earlier this year and add a significant amount of international traffic. In fact, nearly 90% of the revenue from the deal now

comes from international switched service.

MCI was apparently able to significantly alter the service mix of Option 23 because Tariff 12 deals do not place a maximum on the level of any service within the mix. However, most Tariff 12 deals do specify that customers cannot reduce service levels below a preset amount in their initial order.

AT&T is not required to file paperwork with the FCC indicating increases in service levels for new or existing customers. The carrier must file revisions only if terms of the deal are altered or new services are added, according to FCC sources.

Because the latitude exists to change the service mix without reporting to the FCC, some observers last week raised questions about whether customers might be able to boost the 800 service in their deals even though the FCC has said it would bar major revisions of Tariff 12 deals after Aug. 1. ■

Industry Briefs

continued from page 9

last fiscal year ended Sept. 30, 1990.

NCR joint venture. NCR Corp. recently announced a marketing alliance with Pacheco, Calif.-based Century Analysis, Inc. under which the two companies will jointly offer the NCR System 3000 computer line with two Century Analysis communications and information management software products, CAI-Net and CL/7.

CAI-Net allows both Unix and non-Unix computers to share information across local- and wide-area networks.

CL/7 is an applications development tool set that allows users to gather information from across multiple host applications and consolidate it onto a single screen.

NCR and Century Analysis set the value of the marketing agreement at \$25 million. ■

DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

According to a recent national survey by automated teller machine network provider Plus System, Inc. of Denver, 40% of all 18- to 24-year-olds in the U.S. use ATMs, more than any other age group.

Currently, 170 million cardholders of all ages have access to more than 50,000 ATM locations worldwide.

Navy supplies Marines with X.400 gateway to Internet

Gateway to convert X.400 data to SMTP format.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — The U.S. Navy last week teamed up with the Marine Corps on a project that will enable the Marines to swap X.400-based electronic mail and files with users on the TCP/IP-based Internet.

Robert Cooney, division head of research development, test and evaluation at the Naval Computer and Telecommunications Command, said technical personnel from the Navy and the Marines have begun work at the Quantico Marine Corps Air Station in Virginia to connect Marine E-mail users to the unclassified portion of the Defense Data Network (DDN) via the Navy's application-layer X.400/Simple Mail Transfer Protocol (SMTP) gateway.

"The Defense Communications Agency has been after them to get connected to the DDN," Cooney said, noting that the E-mail system used by the Marines today is wholly isolated.

By connecting the Marines Corps to the Military Network, the unclassified portion of the DDN, users in the Marines will be able to reach the larger Transmission Control Protocol/Internet

Protocol-based Internet world.

Cooney said the Marines currently operate an internal E-mail net based on IBM's proprietary DISOSS system, with software residing on 39 IBM mainframes nationwide connected to the Marine Corps Digital Information Network, a large Systems Network Architecture net.

In the first phase of the program, the Navy will install X.400 software directly on the Quantico mainframe and then provide the Navy's own X.400 application-layer gateway to the Marines, which will enable them to support SMTP to connect to the Internet.

The Open Systems Interconnection gateway approach will support the military's long-term interest in OSI as another key military project, the Defense Message System, develops over the next five years and the DDN itself slowly migrates to OSI.

The initial portion of the Marines' project, in which its IBM host will be connected to one of the Navy's X.400 gateways, will probably be completed within a few months.

But Cooney noted that experience with various vendor implementations of X.400 standards *(continued on page 29)*

NCR taps 3270 as key link in client/server package

By Paul Desmond
Senior Editor

SAN DIEGO — An NCR Corp. unit here recently announced it has acquired the marketing rights to Network Software Associates, Inc. (NSA) terminal-emulation software, a move intended to help users migrate to client/server-based networks.

NCR's Network Products Group-San Diego will package an enhanced version of NSA's DynaComm/Elite 3270 emulation software with NCR's existing SNA WorkGroup Services, which is Systems Network Architecture gateway software for NCR System 3000 Unix computers. The product package is dubbed SNA WorkGroup Support.

The SNA WorkGroup Support software package is intended to help users of the NCR System 3000 — which is traditionally employed as a Unix-based multi-user system — migrate to a client/server environment, said

Charmaine Todd, product manager for SNA products at NCR's Network Products Division-San Diego.

"It allows the user to take advantage of the existing 3270 applications that reside on the IBM mainframe and the applications that reside on the Unix server and really transition between the two worlds," she said.

NCR will sell the NSA product, which NSA developed with FutureSoft Engineering, Inc. of Houston, as NCR DynaComm/Elite. Like the NSA version, the product runs on DOS-based personal computers, uses Microsoft Corp.'s Windows 3.0 graphical user interface and works on Network Basic I/O System local-area networks.

Protocol support

NCR and NSA worked jointly to enhance NCR DynaComm/Elite so that it would work with *(continued on page 14)*

Data Packets

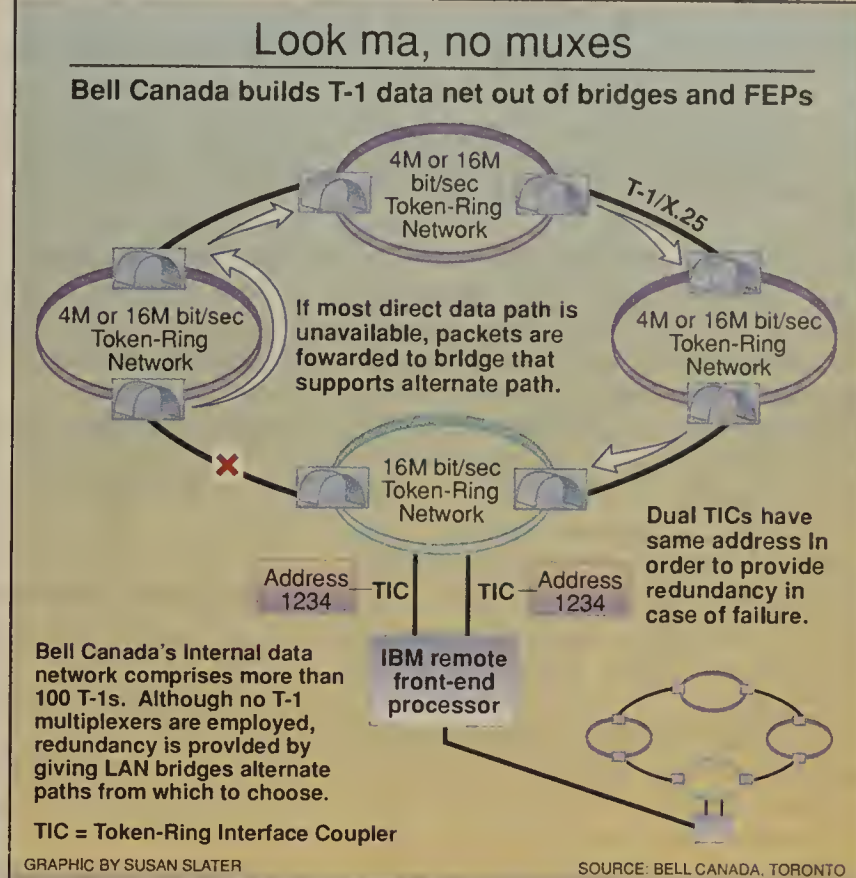
Cisco Systems, Inc. last week announced it has licensed Network Computing Devices, Inc.'s XRemote software, which will be used to let Cisco terminal servers communicate at high speeds over serial lines with remote X Window System terminals.

XRemote compresses X Window data, enabling it to be transmitted about 10 times faster than the Serial Line Internet Protocol, the widely used alternative, Cisco said. Cisco will run the software on its terminal servers, thereby off-loading the compression task from the host.

Beginning in October, XRemote will be offered as a standard feature of Cisco's terminal servers, which include the 96-port ASM, 32-port MSM and 10-port STS-10x.

The software will be offered free to users enrolled in Cisco's software maintenance program.

Republic Telcom Systems Corp. of Boulder, Colo., recently announced that its Network Control System (NCS) management systems have completed compatibility testing with AT&T's Accumaster Integrator. The tests certified that NCS alarm interface software complies with AT&T's technical specifications. ■



Bell Canada builds T-1 net sans muxes

Carrier utilizes DSU/CSUs to build dual meshed backbones supporting internal bridged LAN nets.

By Paul Desmond
Senior Editor

TORONTO — To support its internal data network, Bell Canada has constructed two fully redundant T-1 backbones that employ more than 100 T-1 lines but no T-1 multiplexers, a configuration the carrier said saves money and simplifies installation and maintenance.

Bell Canada uses only data service unit/channel service units (DSU/CSU) to support its two meshed T-1 backbones, which interconnect IBM Token-Ring Networks and Ethernet local-area networks at more than 60 sites. The carrier relies on routing mechanisms built into its LANs, bridges and data networking architectures — including Systems Network Architecture and Digital Equipment Corp. DECnet — to provide the reroute mechanisms typically supported by intelligent T-1 multiplexers.

"It makes a lot more sense to us not to use muxes," said Vic Salomone, a network performance analyst in the operations department at Bell Canada here. The carrier uses LANs extensively because they give local administrators the flexibility to configure their sites as they see fit and require only a LAN bridge to link to the wide-area T-1 backbone.

Also, since no multiplexing of low-speed data lines is required, the carrier needs only DSU/CSUs to support the T-1 back-

bones. The DSU/CSU network — based on equipment from Digital Link Corp. — is less expensive and easier to install and manage than a T-1 multiplexer-based network, Salomone said.

Bell Canada first installed point-to-point T-1 lines about two years ago, but its T-1 networks have grown rapidly in the past year, he said.

One T-1 backbone is used to support the more than 24,000 devices on the company's SNA network, which is used for office applications and some of the carrier's facility management applications.

The other backbone supports a bridged Ethernet network that consists of more than 1,000 mini-computers or other major nodes and countless personal computers and terminals. It is used for Bell Canada's Operation Support Systems, which handles data collection from switches and facility test applications in the carrier's public network.

Bell Canada has a major data center here and another in Montreal from where it controls computers and other equipment at five smaller remote data centers and about 60 major office buildings throughout Ontario and Quebec. Most offices are already attached to one or both backbones and the others will be soon.

Most sites have both IBM Token-Ring and Ethernet LANs in *(continued on page 14)*

Pitney unveils radio-based net to support service personnel in field

By Paul Desmond
Senior Editor

STAMFORD, Conn. — Pitney Bowes, Inc. is rolling out a radio-based dispatch network that promises to boost the productivity of its field service personnel while also improving customer service.

Following a 150-user pilot test of the network this past July, Pitney Bowes is now rolling out the system to the remainder of its 3,500 service personnel. The network is based on the IBM/Motorola, Inc. ARDIS digital radio net and Motorola portable terminals.

"It's going extremely well, so we're into a full rollout now with the intention of having everybody on-line by the end of October," said Archie Martin, vice-president of customer service for Pitney Bowes, based here.

The radio net will limit the company's dependence on its dispatchers, who accept equipment service calls from users of Pitney Bowes' office and mail processing machines.

Currently, field service representatives call the dispatchers to pick up new messages as they finish each job, then decide which customer to assist next. For large customers, the dispatchers send messages to field staff over a paging system.

With the radio network, dispatchers will be able to send messages directly to the portable terminals, eliminating the need for service representatives to call in.

"It allows me to cut back on my dispatchers by about 60%," Martin said. Additionally, the company conservatively estimates it will save each service representative the 15 minutes per day it takes to find a phone and call in.

"The customer satisfaction improvements I can get with [the radio net] are gravy," Martin said.

▲▲▲

"That 15 minutes per day is about 5% of your manpower," he said. "That's where the biggest potential savings come from. The customer satisfaction improvements I can get with it are gravy."

These improvements include the ability to give all Pitney Bowes customers the

same level of service that today is reserved only for larger customers. The portable terminals will replace the paging system that serves only those large customers, which in turn means service representatives will find out about all customers' problems faster.

Furthermore, Martin said the company has architected the net so dispatchers can tell whether a service representative has read a message. That will help the company meet its commitment to respond within 30 minutes to calls from high-end users.

The net also helps Pitney Bowes catch field personnel as they travel from one customer to another, which is especially important in rural areas where there can be a large distance between sites.

The portable terminals emulate IBM 3270 terminals and provide access to mainframe-based 3270 applications. From the field, representatives can order parts, find out whether a piece of equipment has a service warranty and check its service record.

Service reps can also send electronic mail messages to managers and technicians to get help in solving problems.

The terminals are equipped with internal radio-frequency modems and send digital signals that are carried over the ARDIS digital radio network. Pitney Bowes' nationwide network connects to ARDIS via 56K bit/sec lines from nodes in Los Angeles and Chicago. Traffic is then carried over the private network to the company's data center in Danbury, Conn. ■

NCR taps 3270 as key to package

continued from page 13

Transmission Control Protocol/Internet Protocol-based LANs as well as NETBIOS, said Russ Hertzberg, director of product marketing for NSA, based in Laguna Hills, Calif.

NCR DynaComm/Elite provides Windows-based presentation-layer services to microcomputer users, while NCR SNA gateway software running on the System 3000 provides the lower- and middle-layer protocol conversions necessary for IBM host access. Previously, DynaComm/Elite worked only with NSA's SNA gateway.

NCR DynaComm/Elite supports the Windows 3.0 Dynamic Data Exchange feature, which lets users build links that automatically feed data from a 3270 host application to a DOS application, for instance, to update a spreadsheet as new data becomes available. It also supports a high-performance file-transfer facility and a script language that lets users change the look and feel of 3270 applications, without changing host code, to make them easier to use.

NCR and NSA said they will continue to work together on joint products and more announcements will be forthcoming. They declined to provide further details.

NCR DynaComm/Elite will be available in the third quarter. NCR SNA WorkGroup Support products range in price from \$3,000 to \$25,000. ■

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Bell Canada builds T-1 net sans muxes

continued from page 13

stalled, while others have one or the other.

The Token-Ring Networks are used chiefly as a flexible means of connecting personal computers to the company's SNA net so they can access mainframe-based applications by emulating 3270 terminals. Typically, Token-Ring LANs at a handful of buildings will feed data over T-1s to a Token-Ring-attached remote front-end processor. The front ends are also attached to one another by T-1s.

Each office building is connected to at least two others using IBM's Token-Ring Network Bridge Program, which runs on an IBM Personal System/2. Two bridges are attached to each building's backbone LAN, with each bridge providing a link to a separate T-1 (see graphic, page 13).

A Digital Link DL 551VX DSU/CSU supports the T-1 link on one side and the LAN bridge on the other.

Redundancy provisions

Providing dual bridges and two T-1 paths to each site ensures redundancy, Salomone said. If the primary path fails, LAN packets are simply passed to the bridge supporting the alternate route.

For further redundancy, each front-end processor is attached to its Token-Ring by two Token-Ring Interface Couplers (TIC), both of which have the same address. That lets one TIC automatically back up the other in case of failure.

The Ethernets are configured in a similar fashion, with multiple paths to each site.

Vitalink Communications Corp. bridges supply backbone links, while the networking protocols — predominantly DECnet and the Transmission Control Protocol/Internet Protocol — enable data to

use the alternate path in case the primary fails.

The extensive use of LANs at Bell Canada sites brings a number of other benefits for users, such as the ability to easily reconfigure the LANs as required, Salomone said. It also means that no multiplexing equipment is required to concentrate a number of low-speed devices up to T-1. Instead, the bridges are attached to the backbone at full T-1 speed, although the T-1s are not saturated with traffic.

"The key is to have enough buffer [bandwidth] within the T-1s so that you will allow for routing diversity at any one time," he said. "Currently, we do have plenty of space because we are just rolling all this out."

Another advantage of the network is that DSU/CSUs are easier to install and cost far less than T-1 multiplexers, which have per-port charges that can drive prices up for users needing to attach numerous low-speed lines.

To manage its backbone, Bell Canada uses the Digital Link Management System (DLMS), a product it beta-tested last summer. The DLMS runs on a Sun Microsystems, Inc. SPARCstation and works with the DSU/CSUs to collect extended super-frame format data on line conditions via a 4K bit/sec inband channel on each T-1.

From its data center, Bell Canada can check the status of any DSU/CSU, run tests and collect T-1 line statistics. Additionally, the DSU/CSUs support the ANSI T1E1 management standard, which allows them to broadcast alarm data, as opposed to waiting to be polled. Previously, the company needed personnel on each end of the link to perform tests, which was a problem because some sites have no technical staff.

According to Salomone, the combination of the intelligent DSU/CSUs and the DLMS lets Bell Canada isolate hardware from line faults. ■

LOCAL NETWORKING

PC AND TERMINAL-TO-HOST LANS, GATEWAYS AND MICRO COMMUNICATIONS PRODUCTS

Worth Noting

Banyan Systems, Inc.'s VINES has a 26% share of the high-end network operating systems market (35 or more users per server), according to a survey released recently by Dataquest, Inc.

Netnotes

Fullerton, Calif.-based **Lexel**, a company formed by Micro Technology, Inc., recently released an upgraded version of its Simple Network Management Protocol (SNMP)-based network management software, which is designed to monitor and manage multivendor networks from a single workstation.

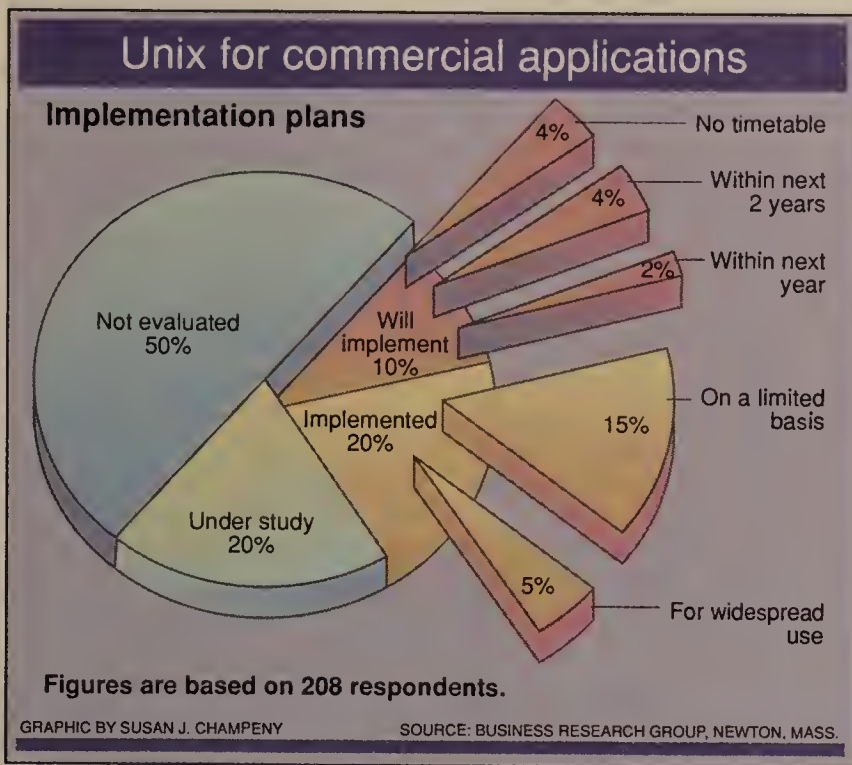
Lance+ Version 3.0 offers several enhancements, such as vendor-specific management capabilities that enable customers to manage vendor-specific network hardware agents using that vendor's SNMP agent. It also incorporates an Ingres Corp. data base for managing the information gathered from the network.

Lance+ 3.0 will be available Sept. 30 for \$20,950. Current customers under support agreements will receive the Lance+ upgrade at no additional cost.

RAD Data Communications has rolled out the Elementary Ethernet Bridge, which provides direct connection between a remote Ethernet segment and a central Ethernet network.

The bridge operates as a media access control-level bridge, transparent to the higher level protocols and operating systems, and runs at up to 256K bit/sec. Connection to the remote site is established by using two units — one connected to the main local-area network and the other connected to the remote LAN.

RAD, based in Rochelle Park, N.J., said the remote-site model of the Elementary Ethernet Bridge is self-learn-
(continued on page 16)



Novell enhances 64K, T-1 routers for NetWare LANs

Supports larger frames for increased throughput.

By Timothy O'Brien
West Coast Bureau Chief

SAN JOSE, Calif. — Novell, Inc. recently announced enhanced versions of its NetWare Link/64 and NetWare Link/T1 routers, which connect geographically dispersed NetWare LANs using 64K bit/sec or T-1 leased lines.

Key features of the new versions include a NetWare Loadable Module (NLM) that allows the routers to operate in NetWare 2.x and 3.x file servers, support of larger frame sizes for increased throughput and an X.21 interface adapter for international common carrier interconnection.

The NetWare Link/64 and Link/T1 are single-protocol routers that can be used only to pass Novell Internetwork Packet Exchange (IPX) packets between NetWare local-area networks. Users needing to support other protocols must employ multiprotocol routers from other vendors.

Duane Murray, vice-president and general manager of Novell's Network Analysis Products Division, said the products will be enhanced with additional protocol support.

"This version addresses the greatest need — NetWare-to-NetWare communications over wide-area links," Murray said. "In the future, we'll be able to route more protocols than just IPX."

The router products consist of a two-port interface board and connectivity software, which is installed in the Novell server or a designated communications server. Each server can support three adapters, providing six separate wide-area network links.

The routers have been available for NetWare 2.x for 18 months. Now with the new NLM software, Novell has added support for NetWare 3.x, which many of its largest customers are now installing, Murray said.

In addition, the Link connectivity software has been upgraded to accommodate larger packet sizes up to 4,096 bytes. The increase can mean as much as a 25% improvement in throughput.

The company is also offering international customers an X.21 interface to telecommunications equipment. Novell will sell the X.21 adapter, along with a serial adapter and a V.35 adapter.

Novell offers the routers for Industry Standard Architecture computers. But users wanting to use the Link products on Micro Channel Architecture (MCA) platforms can obtain an MCA interface from Newport Beach, Calif.-based Newport Systems Solutions, Inc.

Also available is a data compression module, an add-on interface board for routers that support data compression ratios of between 4-to-1 and 26-to-1, depending on the data types transmitted.

Both products are available directly from Newport.

NetWare Link/64 Version 1.1 costs \$1,495, and NetWare Link/T1 Version 1.1 is priced at \$3,995. Both are available now. Users that purchased these products after July 1 can upgrade at no charge. Otherwise, users of Version 1.0 must pay \$625 to upgrade NetWare Link/64 and \$1,500 to upgrade NetWare Link/T1. **■**

University drops net into student rooms

Indiana University gives students access to other users, computing resources via campuswide net.

By Caryn Gillooly
Senior Editor

BLOOMINGTON, Ind. — Instead of requiring students to come to the computers, Indiana University at Bloomington is bringing the computers to the students — in their own dorm rooms.

In the first phase of a plan that may ultimately involve giving every room on campus access to the computer center, Indiana University this week will activate about 2,200 twisted-pair drops for 10Base-T connections in three residence halls. The halls — an undergraduate hall, a graduate hall and a family housing center — are each wired with one twisted-pair jack per living area.

The drops are linked to David Systems, Inc. 10Base-T concentrators that feed traffic into Ethernets supported by a Novell, Inc. NetWare 3.11 server within each building. The servers support word processing, spreadsheets

and data base applications.

Cisco Systems, Inc. routers on the Ethernets will provide access to the data center through the university's campuswide fiber-optic backbone.

Originally, the university provided a central work area in most residence halls that consisted of a cluster of personal computers, printers and a server. Each server contained standard applications such as word processing, data base and spreadsheet programs.

But the clusters were not networked, and students could only access the services by using one of the locally attached personal computers.

Two to three years ago, the university installed the fiber backbone, which linked the clusters and all other campus computing facilities. In addition, the school rewired all the campus buildings with twisted-pair cabling, according to Rhonda Win-
(continued on page 16)

Oracle benchmarks Oracle Server for NetWare 386

By Timothy O'Brien
West Coast Bureau Chief

REDWOOD SHORES, Calif. — Oracle Corp. and Compaq Computer Corp. last week released results of benchmark testing they say indicate that Oracle Server for NetWare 386, running on a 486-based Compaq machine, offers performance that rivals minicomputer-based data base systems.

In a TPC-B benchmark test audited by the San Jose, Calif., consulting firm of Codd and Date, Inc., Oracle Server for NetWare 386 achieved a throughput rate of 43 transactions per second (TPS).

Oracle said the test further demonstrates that users can downsize production data base applications to personal computer-based local-area networks and achieve high performance at a reasonable cost.

"The type of results we achieved would have been the cutoff for acceptable minicomputer performance, but we have now bridged that gap with [Novell, Inc.] NetWare at a much more reasonable cost," said John Kish, vice-president of Oracle's

Desktop Products Group.

The test used by Oracle and Compaq simulated the activities of a major bank with more than 40 branches and four million accounts. The banking system tracked 30 days of historical data for backup use.

The test demonstrates that users can achieve high performance at a reasonable cost.

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For the benchmark configuration, Oracle Server for NetWare 386 was tested on fully loaded 486-based Compaq Deskpro and Systempro computers with over 42M bytes of memory and 840M bytes of storage.

The test results also revealed a cost of \$2,590 per TPS, a figure that represents the transaction throughput rate and the cost of
(continued on page 16)

New tool eases wide-area administration of E-mail

Second package makes updated user E-mail addresses available across enterprisewide net.

By Caryn Gillooly
Senior Editor

ALAMEDA, Calif. — Enable Software/Higgins Group this week will announce Version 2.0 of Higgins Exchange, mail server software that transfers electronic mail between network file servers and between local-area networks running the company's Higgins E-mail system.

The company will also roll out Higgins Name Synchronization (HNS) 2.0, which enables users of the Higgins E-mail system to distribute updated user address lists or directories across an enterprise.

According to Howard Case, sales and marketing vice-president for Enable Software/Higgins Group, based here, the new release of Higgins Exchange will feature a completely rewritten user interface and new features that enable administrators to remotely manage networked Higgins E-mail systems.

Higgins Exchange 2.0 will use the same style interface and menus used with Novell, Inc.'s

NetWare because a majority of the administrators responsible for installing the Higgins E-mail system are also NetWare administrators, according to Case.

"With most E-mail products, wide-area administration has

The new release of Higgins Exchange will feature a completely rewritten user interface.

▲▲▲

been time consuming and has had a steep learning curve," said a spokesman from the Boeing Aerospace & Electronics Division of The Boeing Co., a Higgins user. "[Higgins] Exchange 2.0 makes it easy for anyone familiar with NetWare to manage large enterprise connections."

Some of the new management

capabilities included in the 2.0 version are the ability to add and delete users at bridged LAN sites without disrupting message delivery and the ability to perform routine backups and mail purging from a single location. It also enables administrators to set the system to perform unattended backups and support special passwords for remote procedures to improve security.

In addition to Higgins Exchange 2.0, Enable Software/Higgins Group this week will unveil the latest version of HNS, which was formerly integrated into the Higgins E-mail package.

HNS 2.0 will also have a new, NetWare-like user interface. Furthermore, when the new release of HNS is installed, its menus will have automatically added to the Higgins Exchange menu system.

HNS 2.0 will also have more flexible administration capabilities. For example, with HNS 2.0, an administrator will be able to consolidate remote name lists at hub locations, from which lists can be consolidated into an enterprise master list.

Higgins Exchange 2.0 is available now at a price of \$995. Customers with earlier versions can upgrade for \$295. HNS 2.0 is also available now for \$995. For customers upgrading to Higgins Exchange 2.0, HNS 2.0 will cost \$99. □

Chipcom's intelligent hub geared toward small LANs

Fault-tolerant, 12-port hub can support SNMP.

SOUTHBOROUGH, Mass. — Chipcom Corp. last week rolled out a 12-port, Simple Network Management Protocol (SNMP)-compliant intelligent hub for small 10Base-T Ethernet local-area networks.

According to Chipcom, based here, the new 10Base-T Workgroup Hub will round out its product line by providing a low-cost option for small work groups that don't require the fault-tolerance of the firm's ONline hub product.

The ONline System Concentrator family of fault-tolerant wiring hubs includes an ONline

System Concentrator model for up to 40 users and one for 40 or more users.

"Many of our customers have pockets of users where the multimedia, multiprotocol flexibility of a modular hub is not required," said Frank Fuller, senior product manager at Chipcom. "This new 10Base-T Workgroup Hub delivers a low-cost per port with sophisticated management capability."

Support for SNMP assures that the hub can be managed either locally through a management port on the device or remotely using

an SNMP-based management system. Through remote management, a network administrator can enable or disable ports, obtain fault and status information, and collect statistics down to the port level.

For broader connectivity, the Workgroup Hubs can be linked to ONline System Concentrators, which can then connect to a variety of backbone media, including fiber-optic and coaxial cabling.

According to Chipcom, the Workgroup Hub has a data transfer rate of 10M bit/sec. It is fully compatible with the 10Base-T standard for Ethernet over unshielded twisted-pair telephone wiring. This compliance means that the hub will interoperate with any other 10Base-T device.

The 10Base-T Workgroup Hub is expected to be available in late October and will cost \$2,295. □

Oracle tests NetWare server

continued from page 15

the platform on which the data base runs. Kish said minicomputer costs generally start at \$4,000 per tpsB and rise from there.

In addition to providing performance data, the TPC-B benchmark also included validation tests for data integrity, consistency and failure recovery.

A full disclosure report has been submitted to the Transaction Processing Council and is

currently under review.

Based on the strong benchmark results and early customer demand, Oracle now views Novell's widely used NetWare network operating system as one of its most strategic platforms, according to Kish.

As a result, NetWare will be one of the first platforms supported in the next major release of Oracle, which is expected in the next six to nine months.

Kish said the new release will have the long-awaited two-phase commit feature and further en-

hancements to SQL*Net, the software interface between Oracle and the different operating systems it supports. With the two-phase commit feature, users will be able to verify updates across distributed data bases.

Oracle Server for NetWare 386 comprises four NetWare Loadable Modules (NLM) that run on the NetWare file server. Oracle is continuing to work with Novell and hopes to complete official certification of Oracle Server for NetWare 386 as an approved NLM by year end. □

University drops net into rooms

continued from page 15

frey, assistant director of finance and technology for the university's residence halls.

But the school wanted to bring computer capabilities closer to the users. The goal of the current project, Winfrey said, is to make computing as convenient for students as possible.

"Computing where they live" was the motto of the project, she said. "This is an expansion of the computer services that had previously existed in the halls of residence since 1983. And this is only phase one. We'll study the results and analyze the possibility of extending this to other residence halls."

With the changeover, students with their own personal computers will have the choice of connecting to the local cluster or tying into the campus network.

Connecting to the local cluster will give students the same capabilities available to them before — such as access to standard application packages and printing — but from their own rooms. The university supplies four laser printers per residence hall on which students can print papers and other documents.

Through the backbone, students will be able to connect to the Digital Equipment Corp. VAX complex at the University Com-

puting Services Center. Through the VAX complex, students will gain access to electronic mail facilities and send mail or documents across the campus net to different departments on the campus. Students will also be able to access the university's bulletin boards and other services provided through the VAXes, including access to the nationwide Internet network.

According to Winfrey, students will incur no direct cost for use of the network.

"The current plan is to have no additional charge for use of the service," she said. "It will be part of the room and board package. However, there will be an incremental charge for rental or purchase of the Ethernet card required to connect to the network."

That charge, she said, would run about \$30 per student per semester.

According to the university, the current projection is that about 10% to 15% of the students will use the in-room computer services. But Winfrey pointed out that even if a small number take advantage of the connectivity, the university, as well as its students, will benefit from the project.

"We believe that [students] will find the service attractive and that the services offered will provide us with a marketing advantage over other universities." □

Netnotes

continued from page 15

ing. It recognizes the addresses of all devices attached to it and transmits that information to the unit attached to the main LAN. With this setup, each bridge filters and forwards only the packets that are destined for each segment.

The bridge comes in two models: the single-port model, which supports a single remote workstation, and an eight-port model, which supports as many as eight remote workstations or terminal servers.

Prices range from \$800 to \$1,000 for the single-port version and from \$1,400 to \$1,700 for the eight-port version. Both are available now.

Allied Telesis, Inc. (ATI) last week announced the addition of two new 10Base-T repeaters to its family of CentreCOM Micro Repeaters.

Unlike the rest of the company's repeater product line, both the eight-port AT-MR820T and the four-port AT-MR420T feature internal power supplies, although they are about one-quarter the size of existing repeaters that include power supplies, the Mountain View, Calif.-based company reported.

According to Anders Swahn, product marketing director at

ATI, use of internal power supplies make the repeaters easier to install and use in small work group environments because they do not need the external power supplies required by other repeaters.

The introductory prices for the AT-MR820T and the AT-MR420T are \$549 and \$449, respectively, and will be applicable until the end of the year.

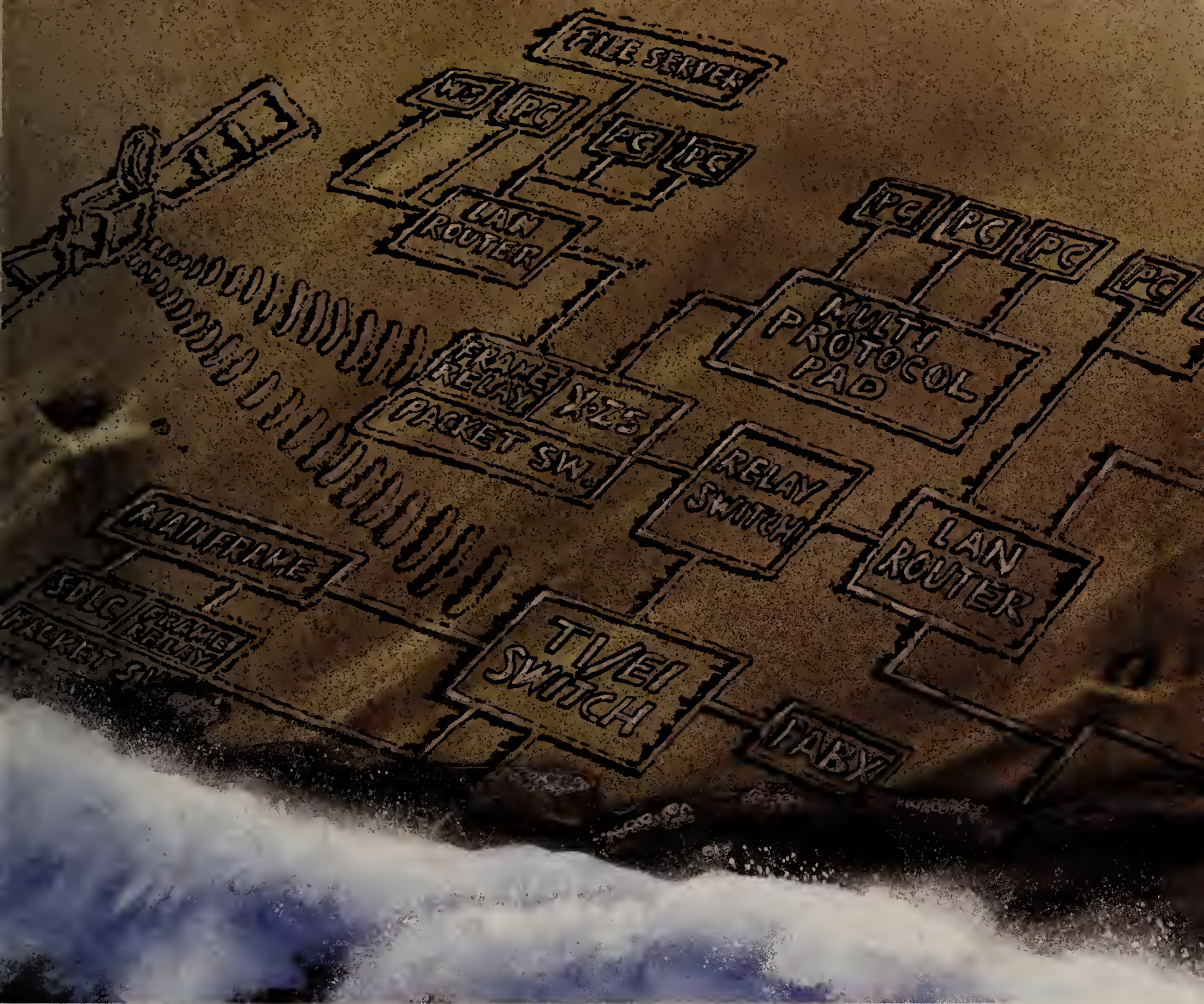
CNet Technology, Inc. has recently brought out a new line of Token-Ring Network interface cards and multistation access units (MAU).

The new Token-Ring cards are the CN1000T, which is a 4/16M bit/sec adapter for IBM Personal Computer, XT, AT and compatible personal computers, and the CN1000T/2, which is a 4/16M bit/sec adapter for IBM Micro Channel Personal System/2 Models 50, 55, 60, 70 and 80 and compatibles.

To support the adapters, CNet, based in San Jose, Calif., released two eight-port MAUs, the CN1000TC1 for IBM Type 1 cabling and the CN1000TC3 for Type 3 cabling.

All products are available now.

The CN1000T costs \$699, while the CN1000T/2 costs \$799. Both the CN1000TC1 and CN1000TC3 are priced at \$549. □



Will your network withstand the tides of change?

Certainly, to the networking professional, networks are not just a collection of boxes to be planned, installed, fine tuned, then ignored to the end of time. Your company's network is a dynamic, strategic weapon. A weapon that must constantly be redefined, restructured, and maintained as a critical, intelligent link, supporting your corporation's strategies.

Attempts to meet demands for greater functionality, higher efficiencies, new technology, change, often erode the network's effectiveness and can even undermine its ability to meet strategic corporate objectives. The problems inherent in adopting new technologies, in mixed computing architectures, compound the challenge. Unfortunately, so do most networking

equipment suppliers.

Most networking equipment manufacturers perform well during initial sale, even through original installation. But because these suppliers have no strategy of their own to meet the impact of change, they blindly address the question of change, especially as it relates to their customer's corporate networking strategy.

For a networking equipment company to be a viable partner, they must be able to demonstrate a proficiency with the major elements of networking. First, they must have the ability to provide the range of intelligent networking solutions so that the appropriate technology can be utilized to enhance or build efficient networks. Second, the ability to blend technologies and products to perfectly fit the requirements,

while maintaining the flexibility of the network, through future changes, new technology, and the accommodation of other vendor's equipment. Third, your networking partner must have the experience gained by being an acknowledged world supplier. Fourth, and most important, they must demonstrate a clear strategy of their own for implementing the first three elements of networking.

Only one company provides all The Elements of Networking. Only one company can help withstand the tides of change. Telematics.

TELEMATICS

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WISDOM...to succeed—is not a new product and is not a new technology. Rather **WISDOM** is a strategy for successfully navigating in the sea of exploding demands and the efficient implementation and integration of both proven and new networking technologies. It is the vision, the technology and product based strategy of Telematics, and as such communicates our commitment to providing our customers evolutionary growth paths from today's networks to tomorrow's networks.

WISDOM defines comprehensive network services, including Frame Relay, diverse network access protocol support, cost effective internetworking for LAN-WAN connectivity and efficient flexible solutions for your network management requirements. And as the world shrinks and new technologies evolve, **WISDOM** will accommodate them.

WISDOM is our strategy for protecting your current investment and for dealing with the tides of change.

NET 25 *Plus*

Telematics Net25 + + product line enhancements, incorporating Frame Relay Network Services and T1/E1 circuit switch services, extend our leadership position. The new NET25 + + management architecture not only supports these new functions but also provides the flexibility to manage other vendor's products while providing interoperability with different enterprise systems.

NET25 + + networks are based on proven Telematics technology, Access Communications Processors (ACP's), Digital Wideband Exchanges (DX's) and Programmable Communications Processors (PCP's). Each platform incorporates a hardware and software architecture permitting deployment to address access, concentration or backbone requirements.

NET25 + + is unique in the industry, supporting voice, data and video integration, OSI (X.25, Frame Relay) and all major standards, as well as value-added facilities and special protocols. In fact, Telematics products and our Telematics Application Partners (TAP's) can provide the most comprehensive range of network access protocols and applications in the industry.

Frame Relay

Telematics supports Frame Relay in addition to our range of network access protocols. NET25 + + with high performance X.25 and Frame Relay Services (T1 and E1 Speeds) is

positioned to provide cost effective solutions for LAN-WAN connectivity utilizing public or private network services around the world.

Telematics WISDOM strategy will continue to bring to the market a range of functionality that will enable expanded network solutions incorporating Frame Relay and Access Services to address this emerging market.

Digital Wideband Networks (DX)

Telematics Wideband Networks Product Line provides us with the industries most flexible bandwidth management functionality, enabling very cost effective circuit switch networks, capable of integrating voice, data and video on a global basis.

You can configure your DX network using any of 250 trunk speeds, from 48 Kbps to 2.048 Mbps in 8 Kbps increments. This provides interfaces for the 1.544 Mbps T1 and the international 2.048 Mbps E1 standards. It also means you can build your network in smooth, incremental steps, using all digital transport facilities and services, including national and international carriers and satellite services.

The DX supports any kind of topology. So a small, point-to-point system can grow easily into a large mesh network.

The DX can handle any application that can be transmitted over digital facilities, including data, voice, video, Frame Relay, fax, X.25, low-bit-rate



voice or LAN protocols. In North America, these facilities include T1, fractional or channelized T1, and 56 Kbps DDS service. In Europe and Asia-Pacific they include unframed G.703, framed and channelized G.732, as well as Nx64 Kbps facilities.

What's more, the DX voice support allows you to connect PBXs into the backbone through voice tie lines directly into the DX voice channel cards. Or, using the trunk channel card, the DX accommodates digital transmission trunks at 2.048 Mbps (G.704/G.732) or 1.544 Mbps (D4/ESF). If Channel Associated Signaling is used, voice channels can be cross-connected to any outgoing network. If Common Channel Signaling is used, voice channels can pass

Integrated Networking Solutions



ACP Systems

The SmartNet ACP Systems today provide functionality and configurable flexibility for a wide range of protocols including X.25, SNA-QLLC, SNA-VLU, X.3, X.28, X.29 and BSC 3270. Through Telematics WISDOM strategy, ACP platform enhancements will support Frame Relay, LAN/WAN connectivity and ISDN, thus ensuring SmartNet will continue to meet the needs of its customers.

Telematics SmartNet product line is positioned to address a range of networks requiring modest connectivity needs, or networks utilizing a public network service.

SmartNet is based on Telematics ACP line of network and access platforms combined with Smartview, a comprehensive UNIX based network management system. SmartNet delivers a blend of functionality and cost effectiveness that makes it the premier small or entry level data network.

Network Management

Network Management must be flexible, adaptable, and rich in functionality to provide net-

working personnel power to manage current as well as future networks. Telematics network management direction can do just that.

Telematics Network Management architecture provides a full function management system, incorporating both menu and graphic driven user interfaces, the means to manage other vendor equipment via our open Product Management Module (PMM) integration interface, plus the flexibility to provide network management information to a host or workstation based enterprise management system, such as AT&T's Acumaster Integrator and B.T.'s Concert workstations.

The promises inherent in the concepts of WISDOM mean that Telematics will be advancing new technologies as they evolve; always maintaining the ability to integrate them into your network and always maintaining flexibility. To us at Telematics, the rising tides of change represent an opportunity. The WISDOM strategy provides the course, and our experience will make the voyage successful. WISDOM...to succeed.

TELEMATICS

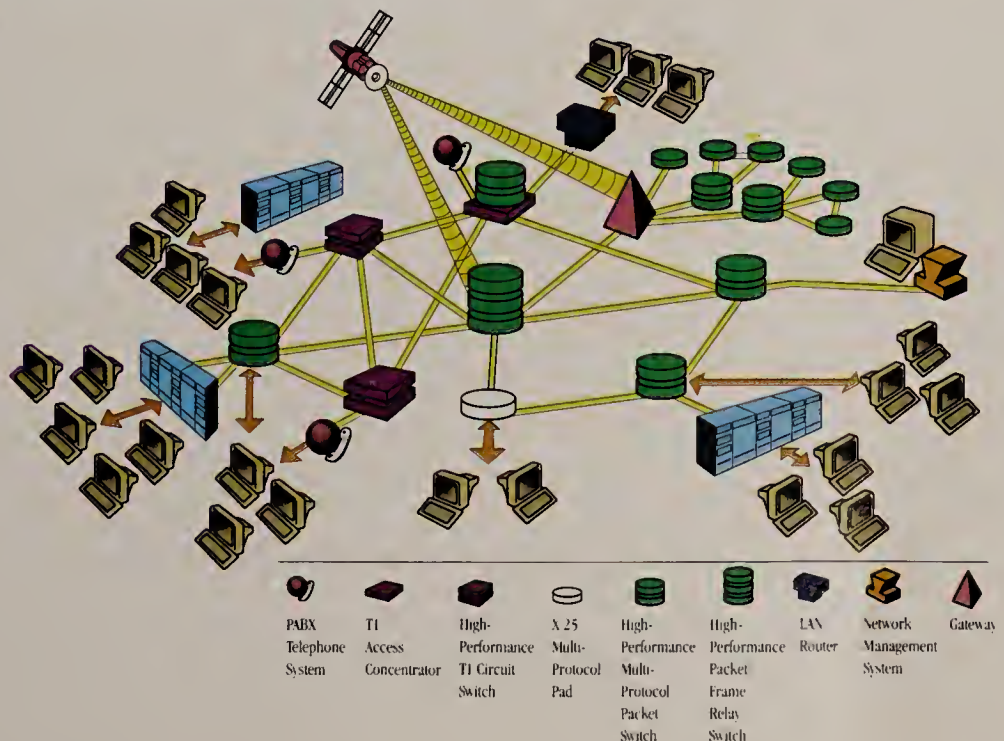
The Elements Of Networking

transparently through the network to the remote PBX. You can even connect an analog PBX to a digital PBX using the capabilities of the versatile DX systems.

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Telematics approach to LAN/WAN connectivity is the most flexible in the industry. It combines the cost effective performance of its Ethernet interfaces and support for the principal router connection protocols with programmable TCP/IP functionality supported on NET25 + + PCP platforms.

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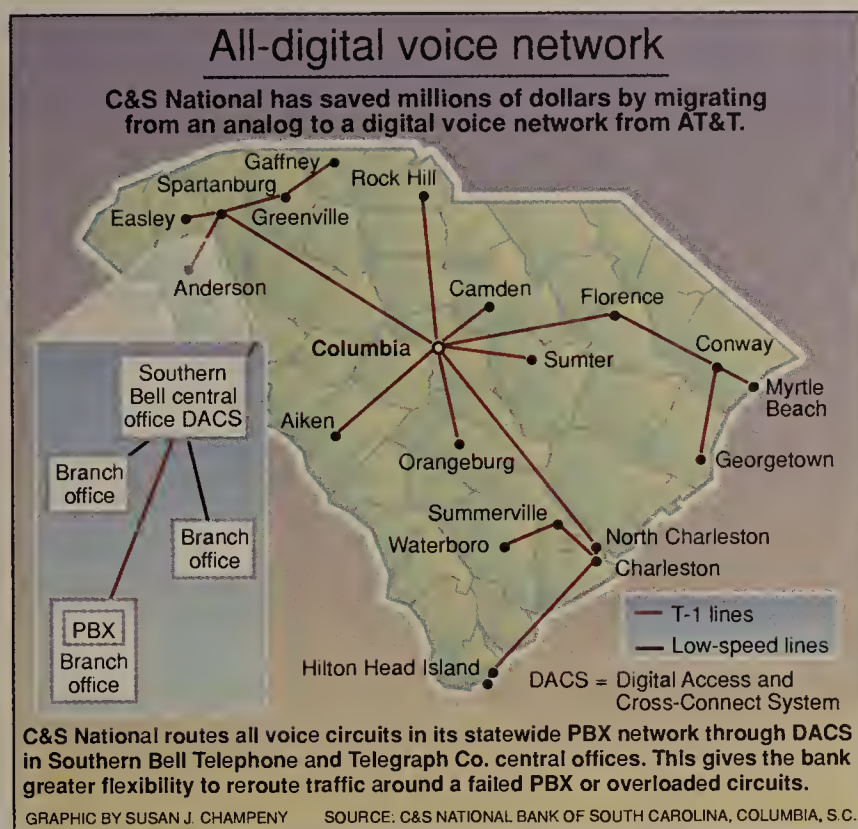
MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USER GROUPS AND ASSOCIATIONS

Worth Noting

“Companies spend too much time and effort justifying a MAP network. We look at the network as another utility that must be implemented. You don't justify sewers or electrical cabling.”

Dave Skiven
Manager of facilities, systems and manufacturing integration
Saturn Corp.
Spring Hill, Tenn.

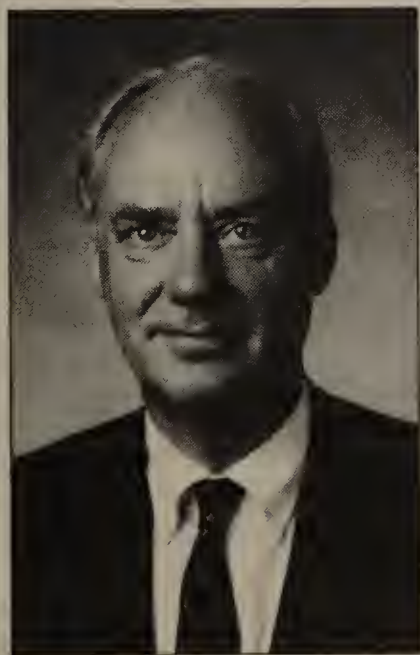


Bank achieves cost savings with single-vendor strategy

Saves \$6m over 5 years with all-AT&T network.

By **Wayne Eckerson**
Senior Editor

COLUMBIA, S.C. — While some companies are adopting open systems to provide an integrated network environment, others are taking a different road to the same end by standardizing on products from one supplier.



C.W. Randall

In 1986, the telecommunications department at C&S National Bank of South Carolina, which is owned by C&S/Sovran Corp., decided to replace a hodgepodge of analog private branch exchanges and other multivendor voice communications gear with digital PBXs, key systems, telephone sets and other digital equipment and services from AT&T.

The project, which was completed last year, has enabled the bank to add a host of new productivity-enhancing features to its electronic tandem network and

tally about \$6 million in cost savings over five years, according to C.W. Randall, vice-president of telecommunications at C&S National here.

“Our [voice] network is as pure as Ivory soap; we are 100% AT&T and digital end to end,” he said.

The bank's network now comprises 23 AT&T System 75 and System 85 PBXs in its major branch offices throughout the state. The PBXs are interconnected using T-1 circuits. About 100 AT&T Merlin key systems at smaller branch offices are tied into the network using 9.6K bit/sec links.

C&S National also uses AT&T's Electronic Tandem Network and Distributed Communications System software, which provide a uniform five-digit dialing plan for all on-net calls and a variety of other features. The software displays an in-house caller's name and number on the screen of an employee's digital telephone set. For off-net calls, the software shows whether the call is local or long distance.

The software also lets employees establish different forwarding paths for incoming calls in case they are not available to answer the phone. This feature has enabled C&S National to virtually eliminate busy signals and unanswered phone calls encountered by bank customers, Randall said.

Standardizing on AT&T equipment and services has enabled C&S National's telecommunications department to reduce the amount of money it allocates to
(continued on page 18)

Top-level backing key to virus defense

Selling the importance of safeguards to executives is first battle in net managers' war against viruses.

By **Maureen Molloy**
Staff Writer

Despite increasingly frequent reports of virus attacks disabling large corporate networks, net executives are meeting with limited success getting corporate backing to implement virus protection strategies for their nets.

Even with the potential for costly downtime and corruption or loss of vital corporate information, managers say it is often difficult to get the funding and backing to implement a virus protection plan as well as the tools needed to safeguard the net.

Joseph Pujlas, information security manager for the state of California, said making the case for a comprehensive antivirus strategy requires constant selling. The key step in implementing a successful strategy involves building awareness among senior executives that the virus threat is real and costly repercussions can result from an attack.

“The introduction of a single virus can knock out a large portion of your network and cost significantly more — in terms of lost data and company downtime

— than the cost of implementing antivirus tools,” he said. “Many [companies] have adopted the attitude that it won't happen to their networks. But with viruses growing more common each day, maintaining that attitude is naive and reckless.”

Because California's state government is divided into largely autonomous agencies, Pujlas has had to obtain authorization to implement security measures from more than 150 division heads.

“State government has high management turnover rates every four years, so I'm constantly selling the concept that antivirus policies are worth the investment,” he said. “If I have more than 50% of management convinced at any one time, then I'm ahead of the game.”

Analysts agree that users are not moving fast enough in adopting adequate antivirus protection plans. Steven Ross, a senior manager at the New York-based Deloitte-Touche, pointed to a recent study that found almost 90% of users nationwide have yet to in-

(continued on page 18)

BOOK REVIEW

BY WAYNE ECKERSON

Book stresses value of net design optimization

Network Topology Optimization: The Art and Science of Network Design, Roshan Sharma (New York: Van Nostrand Reinhold, 1990), \$54.95.

Roshan Sharma's new book, *Network Topology Optimization*, provides a comprehensive look at the tools and methods required to optimize voice and data networks.

While many net managers view network design as a onetime exercise done at the beginning of the network planning cycle, Sharma points out that optimizing network designs is a highly iterative process that requires a fundamental understanding of design, analysis and modeling techniques as well as the use of network optimization software.

His book has drawn acclaim from several university professors who are using it as their primary textbook for courses in network design and optimization.

Sharma, an independent consultant with 32 years of experience in voice and data communications, first guides the reader through a variety of network design tools used to analyze subjects such as data streams, systems reliability, return-on-investment, transmission line costs and backbone traffic. He also describes tools used to calculate throughput, response time and call blocking probabilities on voice networks,
(continued on page 29)

Association Watch

The **Electronic Mail Association (EMA)** will hold its eighth annual conference from Oct. 28-30 at the Fairmont Hotel in New Orleans.

The conference, titled Electronic Messaging '91: Taking Care of Business, will focus on the strategic advantages of E-mail for businesses. It will include a keynote address by Ellen Hancock, vice-president and general manager at IBM Networking Systems division, as well as three days of panel discussions.

Tutorials will be held on Oct. 26. Participants may attend only one tutorial.

The conference costs \$445 for EMA members and \$645 for nonmembers. For those wishing to attend both a tutorial and the conference, the cost is \$690 for members and \$940 for nonmembers.

For more information, contact Mike Cavanaugh at the EMA at (703) 875-8620.

John Covin, vice-president of information systems and services at SciCor Corp., was elected chairman of the **MUMPS Users' Group-North America (MUG-NA)** at the organization's 20th annual meeting this past spring.

As chairman, Covin will lead the organization in serving its 2,300 members in the U.S., and will represent MUG-NA to the MUG International Federation. ☐

Top-level backing key to virus defense

continued from page 17

stall virus protection software.

According to Ross, the key reason virus protection has not received adequate attention is because it is often viewed as an investment that is not balanced by any tangible gain to a company. The success of any antivirus strategy depends on convincing upper management of the importance of protecting information, he said.

"The need for virus protection is not yet widely recognized," Ross said. "It's an issue of awareness and education and must be addressed as a managerial rather than a technical issue."

But some users have found it easier to garner top management support. A large New York financial company's data security manager, who requested anonymity, said she drafted the company's virus protection policy at the request of the chief executive officer.

"Management grew very concerned about the stability of our network after the Internet attack," she said. "I was asked immediately to develop a program that would make our network less vulnerable."

The virus disabled the Internet in 1988, when Cornell University graduate student Robert Morris Jr. used the school's computers to inject a worm into the network.

Brent Dell, vice-president of systems and facilities at AT&T Capital Corp. in Mor-

ristown, N.J., has also won strong top management support. He said parent company AT&T has provided him with guidance and financial support to develop a security strategy and purchase the appropriate virus protection tools.

Unlike some users, who adopt protection programs only after a virus has been discovered, AT&T has established preventive measures to keep viruses from infiltrating its net.

"Protection tools, such as virus scanning software, skills training and update software, are all included as first-order items in our maintenance budget," Dell said. "When you have a business with a \$5 billion portfolio and have mission-critical information on-line, it's foolish not to pro-

tect it as best you can from loss or theft."

He said the importance of virus protection has grown more pronounced as users gravitate to distributed computing environments. "As technology changes and users start hooking more machines together, a greater part of the network becomes susceptible to attack," Dell said. "In the case of a completely internetworked enterprise, a single virus could conceivably knock out your entire business."

Users agreed that protection against virus infection requires constant vigilance.

"The tools are young and require a lot of improvement — especially an on-line software distribution feature to load updated scanning software," Dell said. "It can feel like a never-ending job." □

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Bank achieves cost savings with strategy

continued from page 17

end-user training and to avoid adding personnel, despite its expanding maintenance and service responsibilities over the past five years, Randall said. This combination has enabled the bank to save between \$1 million and \$2 million a year.

Since all employees have identical phone sets that have been customized to the bank's needs, the telecommunications department no longer needs to retrain people how to use the phone sets if they switch offices, Randall said.

Flexible rerouting

Having finished converting its voice network to digital technology, C&S National is now enhancing the network to provide flexible rerouting around failed links or PBXs (see graphic, page 17).

Using a service from Southern Bell Telephone and Telegraph Co. called FlexServe, the bank is routing its T-1 circuits through Digital Access and Cross-Connect Systems (DACS) at the carrier's central offices. Previously, the T-1s passed through the central offices directly between PBXs. Currently, about 30% of the bank's T-1s are linked into the DACS.

In addition, the bank is terminating lower speed circuits from smaller branches into the DACS. These circuits are linked directly to one of the bank's 23 PBXs.

FlexServe enables Randall to quickly reroute traffic around bottlenecks and failed PBXs or circuits by typing commands into a FlexServe terminal, which will soon be located in his office. Currently, the terminal is in a Southern Bell office a few blocks away.

FlexServe has also made it possible for C&S National to consolidate a portion of its data network into the T-1 voice net. Today, each of the bank's 126 branch offices is connected directly to the main data center here via a 56K bit/sec circuit that supports automated teller machine traffic, bank teller and customer service terminals as well as alarms.

The bank's data communications group is now terminating the 56K bit/sec circuits on the Southern Bell DACS and using spare DS0 channels on the electronic tandem network to carry data traffic to the data center.

FlexServe is also likely to play a key role in helping parent company C&S/Sovran and NCNB Corp. merge their bank nets in South Carolina, Randall said. The service makes it easier to cut over new branches or eliminate others from the network. □

INTERNATIONAL NETWORKS

USER STRATEGIES, INTERNATIONAL SERVICES & REGULATION

World News

Hughes Network Systems, Inc. recently said it is supplying a very small aperture terminal satellite net to Lintasarta, a provider of data network services in Indonesia. Lintasarta is a joint venture of several state-owned and privately owned banks, as well as the Indonesian telecommunications service providers Perumtel and Indosat.

The \$5 million deal calls for Hughes Network Systems to install a 7-meter master earth station for Lintasarta in Jakarta, Indonesia, that will communicate with 250 remote VSAT earth stations. Satellite communications will flow over the Palapa-B2R satellite.

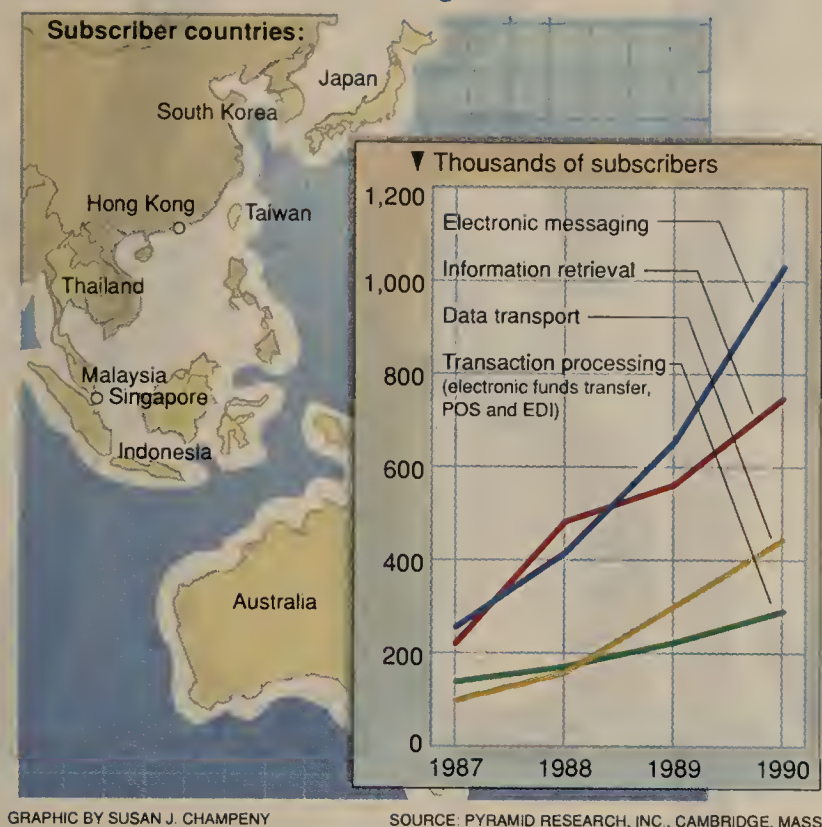
General DataComm Industries, Inc. recently said it has won a contract to supply International Communications Corp. (ICC) with multiplexers that will support a very small aperture terminal satellite service ICC is rolling out in the Philippines.

ICC will use its new VSAT net to supply satellite communications services to banks, insurance companies and other users in that country.

The Canadian monopoly carrier **British Columbia Telephone Co.** recently filed comments with the country's regulatory officials, denying claims that long-distance telephone competition would benefit Canadian consumers.

B.C. Telephone said Canadian long-distance rates have fallen as much as rates in the U.S. since divestiture. ■

Value-added service usage soars in Pacific Rim



Deregulation breaks open VAN market in Pacific Rim

Japan leads the way in surge of new offerings.

By Barton Crockett
Senior Editor

Paced by Japan, usage of value-added network (VAN) services in the Pacific Rim is soaring, driven in part by a loosening of regulatory restrictions that is enabling more service providers to enter the market.

Relaxation of network regulation is enabling competitors to deliver new VAN services that users have been demanding for years, according to vendors and analysts. These offerings include basic transport services, such as X.25 packet switching, as well as enhanced services, such as electronic mail and electronic data interchange.

"You have sweeping tides of market deregulation that are causing the number of service operators to grow," according to

Ross O'Brien, an associate at Pyramid Research, Inc., which recently published a study on VAN markets in the Pacific Rim. "This means that the variety of service offerings for end users, particularly multinationals, is increasing."

Many U.S. companies rely on VAN providers for network links to Pacific Rim locations where data volumes are not sufficient to cost-justify private lines.

According to Pyramid, the number of VAN subscribers in the Pacific Rim grew more than 50% per year from 1987 to 1990, reaching two million last year (see graphic, this page). Pyramid expects that growth to continue, with VAN revenues rising from \$1.76 billion last year to \$11 billion in 1995.

(continued on page 22)

Credit firm to build pan-European net

New backbone to use Netrix integrated switching gear to improve uptime, reduce response time.

By Barton Crockett
Senior Editor

BRUSSELS, Belgium — A major European provider of credit card authorization services recently disclosed plans to build a new pan-European backbone network based on integrated packet/circuit switches from Netrix Corp.

European Payment System Services, S.A. (EPSS) will install Netrix #1-SS Integrated Switching System switches by early next year at five European sites that will be interconnected via a mesh network of 64K bit/sec circuits. The backbone nodes will be here, in France, Germany and at two sites in the U.K.

In 1992, the mesh net will be expanded into Austria, Italy, the Netherlands, Portugal, Spain, Sweden and Switzerland, according to Eileen McDonald, EPSS network operations manager.

The net will replace a portion of the hybrid network of X.25 public packet switched and private-line services EPSS now uses to route data between IBM Series 1 minicomputers serving as communications processors in 27 countries.

The Netrix equipment will replace the Series 1s in 11 of these 27 countries. The Series 1s in the remaining countries will be linked into the new backbone network via private lines or public X.25 packet services.

EPSS plans to eventually replace the rest of the Series 1 net with a network based on Netrix switches but has not set a time frame for the cutover.

McDonald said the new network will help EPSS' owners —

Eurocard International, S.A., Eurocheque International, S.A. and MasterCard International — better compete in Europe's tough charge, credit and debit card marketplace.

The EPSS network serves its owners by routing authorization data between merchants and automated teller machines, and the banks that actually manage

McDonald said the new backbone network will improve response times and reliability.

▲▲▲

Eurocard, Eurocheque and Mastercard accounts for consumers.

EPSS routes all MasterCard credit card transactions over transatlantic private lines to Mastercard's BankNet network in the U.S. Authorization data for Eurocard and Eurocheque, which issue charge and debit cards, respectively, is routed by EPSS directly to the bank in Europe that handles the account.

McDonald said the new backbone network will improve response times and reliability, making Eurocard, Eurocheque and MasterCard cards more attractive to banks, consumers and merchants.

Transactions carried entirely over the Netrix backbone will see response time improvements of (continued on page 22)

What it takes to be the international specialist.

#4 in a series.



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Managing Director,
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Deregulation breaks open VAN market

continued from page 19

Deregulation has helped Japan develop the largest VAN service market in the Pacific Rim. About 880 companies now provide VAN services in that country. Last year, these firms had revenues of \$1.4 billion, which should increase to \$7.3 billion in 1995, according to Pyramid.

Opening up monopolies

Historically, government-owned carriers in the Pacific Rim have had a monopoly over the VAN market as well as the provision of public switched telephone service.

But over the past few years, the VAN service monopolies have begun to fall, beginning with Japan, which opened up its domestic VAN service market to competition in 1985.

Now at least a minimal amount of VAN competition is allowed in nearly every Pacific Rim country, said Pyramid's O'Brien. But the degree of competition still varies depending upon the regulatory climate.

Australia, Hong Kong, Japan, New Zealand and the Philippines are now wide open markets where a great deal of competition is allowed, according to O'Brien. Indonesia, Malaysia and Thailand are also open to competition between domestic VAN providers. But foreign ownership restrictions make it more difficult for foreign-based VAN providers to compete in these countries.

South Korea allows full competition between domestic VAN providers but, until recently, did not allow foreign companies into its market. This was a source of trade friction between the U.S. and South Korea.

Singapore is technically open to competition. But O'Brien said Singapore Telecom, which is a regulator and a carrier in the country, is so dominant that few other VAN providers can compete effectively.

Global services expanding

Competition is most vigorous between VAN providers that serve only one country.

But international VAN providers, particularly those with communications nodes in multiple countries, are also expanding.

One of these companies, Infonet Services Corp., an international VAN provider based in El Segundo, Calif., is jointly owned by MCI Communications Corp. and 10 carriers in foreign countries.

Infonet currently has Pacific Rim nodes in Australia, Hong Kong, Japan, Singapore and South Korea. But according to Ted Iriye, Infonet's vice-president for Pacific Rim operations in Tokyo, the company expects to open a new node in Taiwan this year. Nodes should also be opened in Indonesia and Malaysia during the next two years.

Additionally, Iriye said he expects Singapore Telecom to drop a volume-sensitive tariff it levies on the international private lines that Infonet uses to link its Singapore node to the rest of its network. He said the tariff inflates the cost of providing service to Singapore, thus increasing Infonet's service charges to users.

AT&T and BT North America, Inc. have also recently expanded international VAN operations in Hong Kong as the result of a relaxation of regulations in January.

Reliability improved

The loosening of regulatory restrictions does more than enable international VAN providers to expand service into new countries.

It also helps these providers create more reliable backbone networks for carrying international VAN traffic.

For example, Iriye said past regulatory restrictions kept Infonet from linking its nodes in Japan to both Hong Kong and the U.S. The company could only link its Japanese nodes to the U.S. because Hong Kong and Japan had not yet worked out agreements to let international VAN providers operate between the two countries. This restriction made it difficult to build a mesh network that would enable Infonet to route traffic through Hong Kong to recover from outages on the private line between its Japanese and U.S. nodes. ■

Survey indicates LAN use gaining widespread acceptance in Japan

IDG News Service

TOKYO — Although less than 10% of Japanese corporations have personal computer local-area networks, nearly 40% of respondents in a recent survey said they either use or plan to install LANs.

The survey, conducted by *Computer-world Japan*, showed that the larger the corporation, the more widespread the use of LANs. Though only 8.1% of the 470 companies surveyed said LAN systems had been installed, if respondents considering the implementation of LANs are included, the percentage of organizations that favor LANs rises to 37%.

According to Lee Doyle, director of LAN research at International Data Corp., a market research firm in Framingham, Mass., LAN usage in Japan is much lower than in the U.S. He said that about 36% of all personal computers in the U.S. are now linked to LANs, while only about 2% of all personal computers in Japan are linked up to LANs.

Doyle said there are about 1.1 million LANs now installed in the U.S.

Among the Japanese companies that have installed or plan to install LANs, Ethernet garnered the largest number of responses, followed by token-ring LANs. As for LAN operating systems, Microsoft Corp.'s MS-Networks was the most popular system, claiming 25% of the respondents, while Novell, Inc.'s NetWare was cited as a strong contender as a future LAN operating system.

However, slightly more than 27% of the respondents said they were considering MS-Networks as a viable future option. In short, the future of Japanese networks basically points to two groups of users: the NetWare or Microsoft's OS/2 LAN Manager user who requires a high-performance system, and the MS-Networks user who wants a less expensive system and does not need all the functions included at the high end.

For users who have already installed networks, word processing and spreadsheet applications were the most prevalent on personal computer LANs. Respondents who are studying the introduction of LANs said they would use data base and host access applications. The survey showed that users had lofty designs for LAN use, but when the network is actually installed, fun-

damental applications — similar to those used with stand-alone personal computers — prevailed.

Looking at the figures for server and client workstations, the average user has 4.4 servers supporting 62.4 client workstations.

Regarding the machine respondents use for server and client machines, NEC Corp.'s PC-9801 computers stood out with the largest share of both server and client workstations in the Japanese corporate environment.

IBM Japan and Fujitsu, Ltd., which have a considerable number of installations in large corporations, were also strong contenders. In the case of IBM, the popularity of the Personal System/2 Model 55 high-end server model was greater than expected.

Furthermore, the survey revealed that Unix workstations are being employed widely as servers.

On the client side, Apple Computer, Inc. Macintoshes came in fifth in popularity, showing that they are playing a role in the Japanese LAN market.

According to the survey, 63% of the respondents said they are not planning to introduce personal computer-based LANs. The primary reasons stated were that they were "not necessary for business operations," that they did "not know what can be accomplished by the introduction of the LAN," or "lack of knowledge about LANs." Since the introduction of personal computer LANs has just started in Japan, the understanding of LAN systems is still inadequate.

The survey revealed widespread use of personal computer LANs at educational institutions. A total of 22.2% of these institutions in the country have installed LANs. This number rises to 55.7% when respondents who say they are either evaluating or studying the introduction of LANs are included, with universities and trade schools leading the way.

Petrochemical and construction firms ranked close to educational institutions in their overall attitude toward LANs. Since many of these companies employ computer-aided design (CAD) systems, there is a movement toward using LANs to parcel out the CAD work load. ■

Credit firm to build pan-European net

continued from page 19

30% to 40% compared with the Series 1 network. McDonald said it can take as long as 12 seconds to authorize a transaction routed over the Series 1 network today.

The new backbone should provide 99.98% uptime, while the Series 1 net's uptime is only about 90%. "Response time and availability are important competitive issues," McDonald said.

EPSS chose the Netrix equipment after a lengthy evaluation that began a year ago. EPSS solicited information from 18 equipment vendors, then narrowed the field to three finalists: Bolt Beranek and Newman, Inc., Northern Telecom, Inc. and Netrix.

McDonald said Netrix won for several reasons. First, EPSS liked the fact that Netrix's #1-ISS switches support a wide range

of speeds. Other vendors focused primarily on low- or high-speed devices.

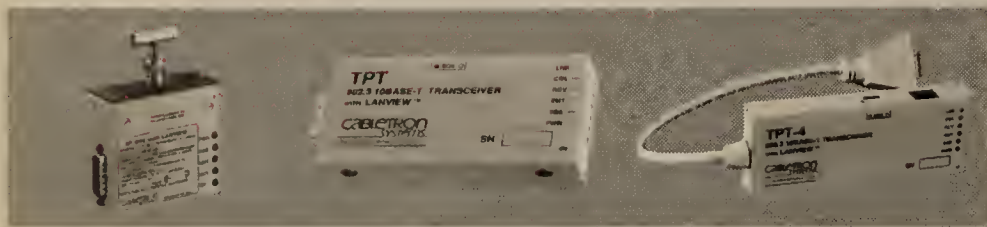
Additionally, McDonald said EPSS liked Netrix's network management capabilities — particularly its ease of use, planned support of Open Systems Interconnection network management standards and ability to provide detailed information about network operations and errors.

"It's a technician's dream and an imbecile's delight," she said.

And although EPSS will initially only use the #1-ISS switches for X.25 packet switching, the company plans to take advantage of the #1-ISS' integrated circuit and packet switching capabilities as the volume of data on its network increases.

Another factor in EPSS' decision was that Netrix's European distributor, Telindus Networks, has support staff in 19 countries, while the next closest vendor has support staff in 15 countries. ■

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PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

First Look

PC vaccination pack gets broader virus coverage

Central Point Software, Inc. last week unveiled **Anti-Virus 1.1**, an enhanced version of its personal computer-based virus vaccination software that comes with increased coverage for viruses and requires less memory than the previous version.

Anti-Virus 1.1 detects and eliminates more than 800 viruses, including Diamond, Michaelangelo and Tequila. The software has two memory-resident virus detection programs: VWatch scans files for known viruses, and VSafe scans for viruses and unusual activity caused by a virus. VSafe now uses 6K of conventional memory when loaded into expanded memory and 21K when loaded into extended memory. VWatch requires 1K of conventional memory when used with expanded memory and 6K when used with extended memory. Previously, VWatch and VSafe required 10K and 24K of conventional memory, respectively.

The update, which is available now, costs \$129, or \$20 for users who already have Version 1.0.

Central Point Software, Inc., 15220 N.W. Greenbrier Parkway, No. 200, Beaverton, Ore. 97006; (503) 690-8090.

Zenith offers 10Base-T module for Enterprise hub

Zenith Electronics Corp. last week announced a new eight-port repeater module for its Enterprise Exchange intelligent hubs.

ETP-8 reduces the per-port cost for a 10Base-T net to \$180 for a 72-node net. This is about one-third less than the per-port cost of Zenith's previous 10Base-T module, according to company officials. The new module has eight RJ-45 ports. As many as nine ETP-8 modules may be installed in an 18-slot enclosure in Zenith's Enterprise Exchange hub to support 72 net nodes.

The ETP-8 is priced at \$1,195 and is available now.

Zenith Electronics Corp., 1000 Milwaukee Ave., Glenview, Ill. 60025; (708) 391-8181.

New NetWare pack sets up batch jobs

By Bob Brown
Senior Editor

PORTAGE, Ind. — Vinzant, Inc. recently announced software that enables users to schedule jobs for batch processing on Novell, Inc. NetWare local-area networks.

The company's Event Control Server enables users to slot jobs, such as file backup, print tasks or automated maintenance, to be executed automatically at predefined times.

The software also allows users to split up some large jobs for execution on multiple servers across the LAN.

Event Control Server is a set of systems tools that enables applications developers or LAN administrators in large organizations to prioritize and schedule batch jobs for execution by the Event Control Server. Some tasks could be given priorities over others, and in the event a high priority task shows up at the Event Control Server, it would run before a lower priority task.

"In our discussions with users trying to implement downsizing projects, they kept asking about [job control language]-like features for NetWare or DOS," said

David Vinzant, company president.

The software resides on one or more NetWare nodes dedicated as so-called job servers, which must run NetWare 2.15 or higher. Event Control Server is based on Novell's Btrieve back-end data base manager, which keeps jobs in prioritized queues.

If desired, the job server can notify users when a job is complete, or bill departments or work groups for jobs that are executed by the job or on a per-second usage basis.

In multiple server environments, jobs can be assigned hardware characteristics and only those servers that meet the requirements would be allowed to process the task.

Event Control Server runs on a workstation or server with DOS Version 3.1 or higher, with 400K bytes of memory, or on an OS/2 machine running Version 1.2 of the operating system and the OS/2 NetWare Requestor software.

Application program interfaces are provided so developers can allow various programs, including NetWare SQL front ends, to send jobs to the server.

The Event Control Server, which includes both DOS and OS/2 versions in the same package, is priced at \$2,995 per site. It is available now.

For more information, contact Vinzant at 4 Skyline Drive, Portage, Ind. 46368, or call (219) 763-3881.

Gateway to air 10Base-T hubs for small work groups

IRVINE, Calif. — Gateway Communications, Inc. is expected to announce this week an eight-port 10Base-T work group hub for unshielded twisted-pair Ethernet networks.

The IEEE 802.3-compatible G/EtherTwist 8-Port Hub connects work group nodes in a star configuration and can be linked to backbone networks using a variety of media, including thin-wire, unshielded twisted-pair and coaxial cable Ethernet connections.

A single hub can support as many as eight local-area network workstations through RJ-45 ports on the front of the unit. Each port has two LED indicators — one showing link test status and the other denoting receive data.

The hub is available in four versions, including one for stand-alone operations. The remaining models offer rear-mounted backbone media filter connectors for expanding the network to other

net segments or Ethernet devices. The company offers an Attachment Unit Interface link to coaxial cable Ethernets, an RJ-45 link to unshielded twisted-pair nets and a BNC link to thin-wire nets.

The hubs come equipped with Gateway's Hub Management Software, which lets users control and monitor the hub through a personal computer linked via a direct or modem serial line. The software enables an administrator to control and monitor port-connected status, unshielded twisted-pair port link test signal and automatic polarity reversal, as well as automatic reconnection mode.

Available now, the G/EtherTwist 8-Port Hub is priced from \$500 to \$580, depending on the backbone interconnection medium used.

For more information, contact Gateway at 2941 Alton Ave., Irvine, Calif. 92714, or call (714) 553-1555.

NSC opens channel extenders to DASD

Network Systems' RDS line will support mainframe storage devices as if locally attached to host.

MINNEAPOLIS — Network Systems Corp. (NSC) this week will announce a series of enhancements to its Remote Device System (RDS) channel extender line that will enable the units to support remote mainframe storage devices as if they were locally attached to a host.

The company also plans to unveil a new line of channel extenders to support links to tape drives.

Mainframe channel extension for direct-access storage devices (DASD) will enable users to augment disaster recovery strategies by deploying IBM or third-party DASD or tape drives at remote locations and using them to back up data as it is written to local drives.

Users can install a remote DASD device to mirror a local disk unit and keep back-up data current, instead of dealing with archived data from the day before. This would protect users in the event of an outage or disaster at a primary data center.

Frantz Corneille, RDS product manager at NSC, said DASD controllers, such as IBM's 3880 and 3990, Memorex Corp.'s 6890, EMC Corp.'s Orion/STK 4080 and other plug-compatibles can be relocated locally over Fiber Distributed Data Interface nets as well as longer distances via T-3 circuits. The RDS supports both solid-state and rotational DASD devices.

"IBM pretty much blessed the concept of extending disks over a wide area when it announced [Enterprise System Connection]," Corneille said. IBM's ESCON architecture defines a fiber-optic channel for IBM System/390- and 370-based processors that operates at 10M byte/sec at distances up to 5.6 miles.

Corneille explained that DASD support on the RDS line will give users concurrency of data, so remote disks will handle the same data available to users on local drives.

"By the very nature of a disaster recovery plan, you should want your critical data volumes accessible at a remote location," he said.

NSC added the DASD support to the RDS line in the form of a hardware/software enhancement to the unit, along with software that resides on an IBM host. The software emulates an IBM channel control program over the wide-area connection, giving

the remote DASD unit a full set of command sequences, instead of forcing the unit to process one sequence and echo back to the host for additional instructions, thereby creating delays.

"We behave as if we were the true mainframe channel," Corneille said.

DASD support on the RDS lines is being offered as a free upgrade to existing users, while base prices for the RDS models will remain unchanged for new customers.

Corneille also said it added a multihop support feature to the RDS line that enables the channel extenders to route data over sev-

“By the very nature of a disaster recovery plan, you should want your critical data volumes accessible at a remote location.”

▲▲▲

eral hops in a mesh network in order to reach their destination. Previously, NSC's channel extenders communicated on a point-to-point basis, with each channel extender requiring a separate line to each user location.

Instead, NSC's Multi-Hop Application can be used to design a channel extension network that allows users to pass data from one channel extension site to another via a series of hops. This feature provides for alternate path routing in the event a circuit or equipment fails on a primary data path.

The multihop feature is available now on Release 3.1 of NSC's MVS-RDS for IBM MVS hosts and is offered as a free upgrade.

NSC also upgraded the RDS line with the introduction of its RDS Printer Support Application, which enables a user to establish a channel link via satellite to a remote printer.

This feature enables IBM 3800 laser printers located remotely from the data center to operate at channel speeds. The RDS Printer Support Application is available

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OPINIONS

FACSIMILE

BY WILLIAM ROBINSON

Does facsimile technology have a future?

Few recent innovations have caught on as quickly and completely as the facsimile. Yet despite this success, there is still reason to question the future of the fax as we know it today.

The most obvious complaints against the fax are its low quality of reproduction, slow speed and inability to mix voice, video and data traffic. Networked microcomputers can easily and cheaply improve on all of these factors.

Another set of issues is even more interesting than these simple complaints. When a new technology is applied to the work environment, it is important to determine if the technology changes the work flow or if it merely changes the speed of the existing flow. If the technological innovation does not alter

the work flow itself, it is likely to be only an intermediate step, rather than a final form.

By this criterion, the fax is not a final technological step. A purchase order submitted by fax typically is generated by a computer, printed on hard copy and sent by fax to the receiver, who takes the transmitted hard copy and enters it into a computerized order system. Using fax in this manner merely enhances a largely manual process.

Because it is clearly inefficient, fax transmission will eventually be replaced by direct computer-to-computer communication. Some companies already offer such services, allowing for instantaneous acknowledgement and transmittal of shipment dates, as well as easy order tracking.

Communication by fax eliminates the delays involved with sending information through the postal service or even overnight mail. Personal computer-to-host input adds considerable value.

Many offices just have one fax machine in a communal setting. This creates additional difficulties for fax lovers. Verification of the fax sender's identity is difficult, if not impossible. Faking a fax is remarkably simple.

The personal computer, on the other hand, can be equipped with software that provides at least some measure of authentication.

Similarly, nonrepudiation is an issue. How does the sender know for certain that the fax was delivered to the person intended? Electronic systems, on the other hand, can be programmed to give a reasonable degree of certainty.

Security is a nightmare. How many people see a typical fax before it makes it to the recipient? Does every passing secretary read the confidential memo spilling across the floor when the tray overfills? While not perfect, electronic systems are more secure.

Compared to fax transmission, computer-to-computer exchanges are faster and of higher quality. They allow the transmission of any type of digital information and can be interactive. In addition, they eliminate the need for data entry by the receiver and provide for better security and integrity at all points of the exchange. And an important document will never sit on your desk as a tightly wound scroll of thermal paper.

The fax is limited technology filling a temporary gap. In the future, computer-to-computer communications will make the world a much better place. ■

Robinson is the director of computing and information systems with the University of Nevada at Las Vegas.

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EDITORIAL

Users should press EDI providers for X.400 links

ANSI's new Interconnect Mailbag Structure is designed to improve the reliability of interconnections between electronic data interchange services, a move that appears to be good news for users.

But adoption of the Mailbag standard may really be a victory for vendors at users' expense.

EDI service providers have agreed to implement Mailbag instead of X.400 as a gateway between their networks. Most say the new standard is the most expedient way to solve the interconnection problems that plague users.

But critics — including some service providers — say the real reason vendors support Mailbag is because they don't want to spend the money to implement X.400 and don't have confidence that X.400 links will work. That's too bad because X.400 provides better controls and audit trails than Mailbag.

What's more, vendors only have to look around to see examples of service providers that have successfully implemented X.400 gateways. For instance, European EDI carriers have begun to interconnect their nets using X.400, and on this side of the Atlantic, AT&T EasyLink Services and Telecom Canada have also done so.

Carriers have spent three years debating, designing and developing Mailbag and will spend another year getting it into production. If vendors had spent this time implementing X.400, they would have finished long ago and users would now have reliable links.

Once Mailbag is in place, vendors will have little incentive to replace it. Vendors say large users will press them to implement X.400, but as an access method to their networks, not necessarily for connections between value-added networks.

Users shouldn't let the service providers off the hook so easily though. They have to take a proactive stance and force vendors to bite the X.400 bullet.

EDI users would do well to heed the lesson of the electronic mail community, which, under the leadership of the Aerospace Industry Association, demanded that E-mail carriers interconnect using X.400. Within two years, all E-mail carriers were fully linked using X.400.

EDI messages contain information more critical to business operations than E-mail. EDI users, like their E-mail counterparts, should demand X.400 links. Users should voice their concerns now to stop vendors from taking an expedient action that serves their own interests over those of their customers.

The sooner vendors make the investment and become familiar with X.400, the sooner users will have reliable links. ■

OPINIONS

THE FUTURE OF NETWORKING

BY JAMES HERMAN

Making your internet suitable as a production utility

With all its advantages, it's no wonder that internetworking is fast growing and popular. It can save users money by reducing the number of parallel data circuits required and allowing the use of more cost-effective, high-speed circuits, such as T-1 and T-3.

In addition, the technology has been designed to support local-area network-based distributed computing, not older forms of centralized processing or time-sharing.

Since the design of almost all new applications is based on a distributed model, internetworking is a key enabling technology for the next generation of computing. Most importantly, the multiprotocol nature of the technology allows it to be the transition vehicle for the migration to open systems.

But it's also true that internetworking is the most troublesome technology to come along in the last decade.

The basic problem is that most major enterprises now depend primarily on this technology in the routine operation of their businesses. However, management of the internetwork has not yet been handed over to an operations group that can provide around-the-clock support.

Internetwork troubleshooting is notoriously difficult. Internetwork support people live in fear of broadcast storms that can disable a campus or even the whole internetwork. They commonly deal with outages that last several days, in which each device in a building has to be disconnected one by one to find the offending wire segment, tap or interface unit — not exactly a state-of-the-art fault isolation technique.

Almost everything that goes wrong with an internetwork re-

quires a highly trained technician — an engineering guru — to do the diagnosis. The tools that do exist mystify most of the existing net operations staff.

Even after many rounds of training courses, most operators are still unable to take operational responsibility for bridges, routers and LANs. Operators and telecommunications managers report a feeling of helplessness with regard to the internetwork. They just don't know how to deal with it.

Today's internetworks are often out of control. They are growing rapidly but with little or

troubleshoot. However, as the internetwork grows and becomes a de facto production utility, the engineers don't want to be burdened with supporting it either. In some cases, the internetwork becomes an orphan with no one willing to take formal responsibility for it.

At an operational level, internetworking technology is a step backward in many ways. It was not designed to make fault isolation easy and contains few well-defined segmentation points.

There are basically no tools or techniques available for internetwork topological design or cost optimization. If traffic on the internetwork begins to stagnate, most enterprises buy a few more routers and T-1 lines. Internetworks grow haphazardly, and performance and reliability often deteriorate suddenly for no apparent reason.

Users expect the internetwork to grow and adapt to new applications, devices and sites. This may not be true much longer unless fundamental changes are made in the way companies design, plan and operate their internetworks.

More standardization of internetwork components within a given enterprise is needed. Widespread implementation of smart hub technology is another critical enhancement that will improve fault isolation and configuration tracking. Definition of an organizational model for internetwork operations is also a key step.

To be a production-quality enterprise utility, management of the internetwork must be handed over to net operations. Its problem resolution and change management procedures must be formalized, standardized and demystified.

Although the internet approach to enterprise networking holds great promise from a technical and economic standpoint, it must become more reliable if the enterprise is going to run its business on this new distributed computing infrastructure. ■

Internetworking is a key enabling technology for the next generation of computing.

▲▲▲

no configuration tracking or record keeping. Users plug in their microcomputers, workstations and servers and repatch connections with bridges, routers and LANs at will. Little or no testing is done before a device is attached, resulting in frequent disturbances that can affect hundreds of users.

At a more fundamental level, no one within the enterprise can agree on the organizational approach to managing the internetwork. What is managed centrally and what is managed locally are not well defined, often resulting in internal battles for control.

It's quite common to find management responsibility for the internetwork in the hands of some engineering group rather than where it should be — with the production network operations group.

Many operations groups refuse to take responsibility for a network that is so difficult to

Herman is a principal with Northeast Consulting Resources, Inc., a Boston consulting firm that focuses on strategic management and information technologies.

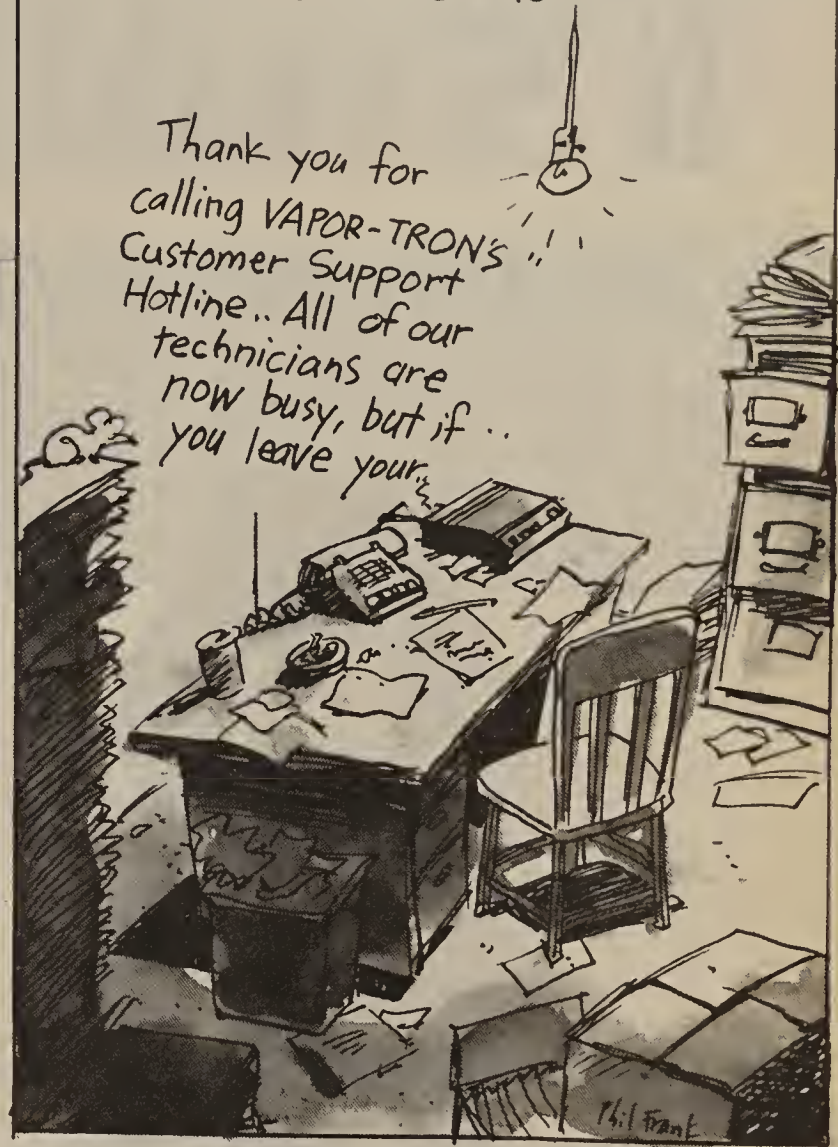
LIKE ALLIGATORS IN A SWAMP, unforeseen problems can really put the bite on a communications operation. Many managers find themselves wrestling with these networking reptiles every day.

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TELETOONS

BY FRANK AND TROISE

Suspensions Confirmed: Scenario #45



LETTERS

Becoming user-friendly

As a user of many types of technology from the manual toothbrush to the automatic garage door opener, as well as a computer user and network designer, I feel the predicament described in the recent opinion column on network planning by Bill Gleason ("Wanted: Users unafraid to use the network," NW, Aug. 19) is inherent in every organization and business that uses computers. But it sounds to me as if Gleason's company is lost on the route of bad technology design.

The problem for most Fortune 500 firms is not that they need "users unafraid to use the network." Rather, they need computers and nets that are easy, pleasant, useful and maybe even fun to use. Unfortunately, while the technologists may love it, the vast number of users are not "afraid to use the network;" they just hate it.

If technology is useful, pleasant and fun, then users will rush to learn. They won't need to go to classes because

they will teach one another.

Part of the difficulty is probably that Fortune 500 companies selected computers by power and price but gave little consideration to the way humans think and work.

My advice, as one who finds his computer and network fun to use, is to locate a better computer system. Perhaps your Fortune 500 company can be convinced to use it. Certainly, your users will use and support it.

Nicholas Bachur
Professor of medicine,
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University of Maryland
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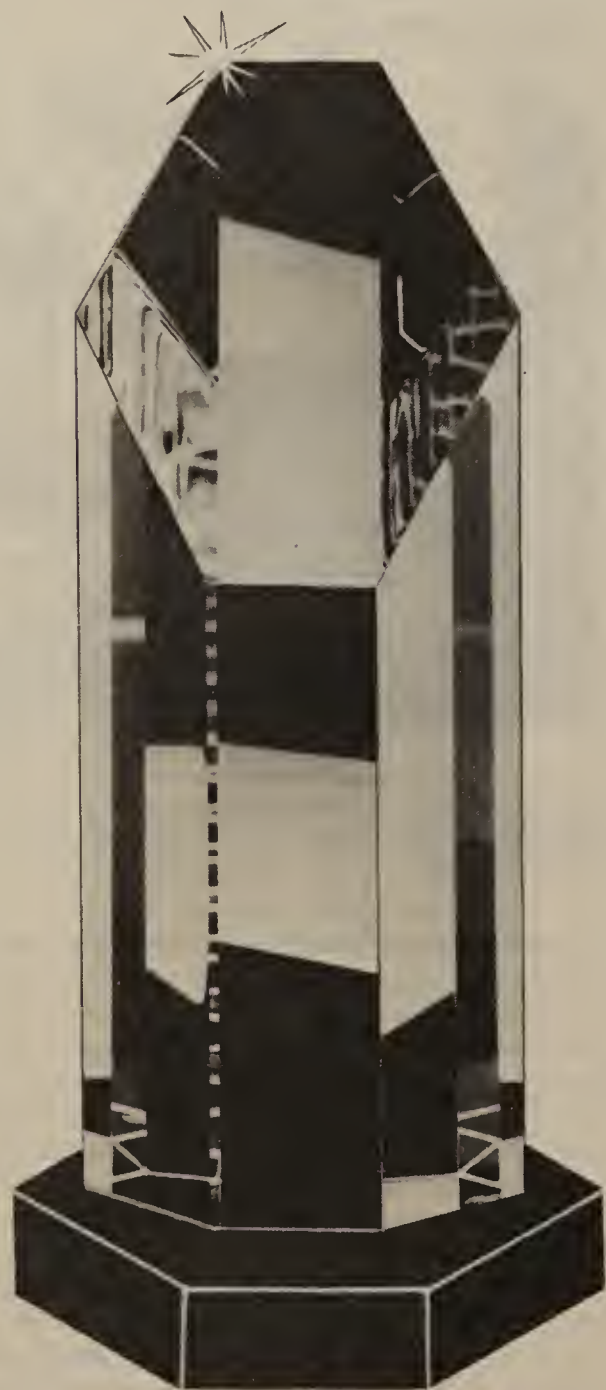
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OPTICAL SWITCHES



Optical switches to answer call for more bandwidth

CONTINUED FROM PAGE 1

optical switching is likely to be required when aggregate demand rises to the range of one trillion bit/sec (terabit/sec). Current electronic switches are not capable of operating at such speeds.

A new type of switch based on optical technology will be needed. Optical switches will route packets of light, or photons, rather than electrons, the particles that today's switches route.

Optical switching isn't entirely futuristic. Mechanical optical switches and some elementary electronic optical switches already exist and are in operation today (see "Already here: Some simple optical switches," page 29). Laboratory work is now underway to upgrade this basic functionality so that it has the sophistication needed for telephone switches and customer premises equipment.

How fast? How soon?

Net planners working for the telephone companies envision the need for central office switch-

es that operate at rates about 2,000 times faster than today's quickest electronic switches.

It's likely to take decades before ordinary, urban central office switches will have to migrate from electronics to optics, but researchers are now trying to design such switches on the assumption that demand for enormous bandwidth will eventually arise.

Planners are basing their work on the scenario that by early in the 21st century, every customer attached to the U.S. public telecommunications network will require a 155Mbit/sec access channel. The 155M figure was selected because it is one of the basic data rates of Synchronous Optical Network, the first multiplexing stan-

dard designed to handle fiber circuits, which use only electronic multiplexing.

In the unlikely occurrence that every customer on the network would use all 155M bit/sec at the same time, a switch would have to handle about 10 terabit/sec of information.

Bell Communications Research planners estimate a more realistic figure would be a maximum usage level of 10% or 1 terabit/sec. This ballpark figure is driving switch research in many labs today.

The natural question then becomes: When will these switches appear? Unfortunately, progress toward building full-fledged optical telecommunications switches

is difficult to measure. Several research groups, including ones at AT&T Bell Laboratories, Bellcore, IBM and Nippon Telegraph and Telephone Corp., have built and demonstrated simple optical switches.

Yet the simplicity of these switches belies the years of research that went into developing them. Much of this development time went into learning about the basic technologies needed to build working optical switches.

Now that researchers have learned the basic physics involved in optical switching, more complex switches aren't likely to take as long to develop. But researchers into optical switching still hesitate to forecast when switches will be deployed or what size they will be.

Narrowing the options

However, scientists have learned important fundamentals. For example, recent research has eliminated some possible switching scenarios.

(continued on page 28)

When bandwidth demand soars, the phone switch will have to be enlightened.

(continued from page 27)

A few years ago, optical researchers believed that future networks might be all-optical. They were working to devise switches that wouldn't need electrons at all. But scientists no

ically, says Scott Hinton, head of the Photonic Switching Department at Bell Labs. All the components of a normal switching system — the switching software, control hardware and the data base with net addresses — will

wave switches is inherent in the devices' nature. Guided wave switches act as a passive channel, which means the devices do not know whether there is light in them.

The most common material used in guided wave switches is lithium niobate, a photorefractive crystal.

The way light travels through a material depends on a property of that material called the index of refraction, which is the ratio of the speed of light in that material to the speed of light in a vacuum. The basic idea behind the photorefractive switch is that the index of refraction can be changed and then changed back by exposing the photorefractive crystal to different light beams.

For example, laser light coming into two sides of a matrix cross-connect switch could strike the crystal and alter the index of refraction. This modification can be used to change the direction of a light signal because a light wave passing between regions with different indexes of refractions will bend (similar to what happens when light passes from water to air).

Switches based on lithium niobate materials are already sold commercially. For example, BT&D Technologies introduced a two-input by two-output lithium niobate switch about three years ago.

Bellcore has taken quite a different direction with one of its research projects. Rather than using a passive device, one group of researchers within Bellcore is investigating a self-routing packet switch.

This type of device is an optical version of a switch structure known as a Batcher-banyan switch. It consists of switching cells each with two inputs and two outputs, all of which can be wired together.

A Batcher-banyan switch doesn't need an external control in order to set the direction of each switching cell. Each cell decodes a portion of the packet and sends the data on the correct path through the switch. This approach is diametrically different from guided wave switches, which are totally passive.

Conceptually, a Batcher-banyan switch that could support ter-

switching chips made with low-powered CMOS technology.

Switching gears

The two approaches discussed above, while exploiting new technologies, are similar to existing

length's portion of the total signal. For example, a WDM system could have three sets of switches, with each set operating on a different wavelength. Proponents say this architecture would boost the system switching rate by a

With WDM, several wavelengths of light are transmitted through a single fiber.

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switching systems. Other switching schemes exploit the optical properties of the signal to help make better switches.

Wavelength-division multiplexing (WDM) is one such tech-

factor of three, even though each set of switches operates at a lower rate.

The drawback to WDM systems is that for each wavelength, the user needs one of everything.



A prototype of a free-space optical switch built from symmetric self electro-optic effect devices shows that the technology has a way to go before these switches will be deployed in telephone networks.

nique. With WDM systems, several different wavelengths of light are transmitted through a single fiber, with each wavelength carrying an individual signal. This technique can have both advantages and disadvantages. One disadvantage is that each wavelength must have its own switching device that can send several signals down the same fiber. In addition, each switch must be electronically controlled.

However, switching each wavelength separately can also have advantages. If the information was sent in one signal using a single wavelength, the switch would have to read the destination address on each packet and route each packet individually — a difficult task at terabit-per-sec-

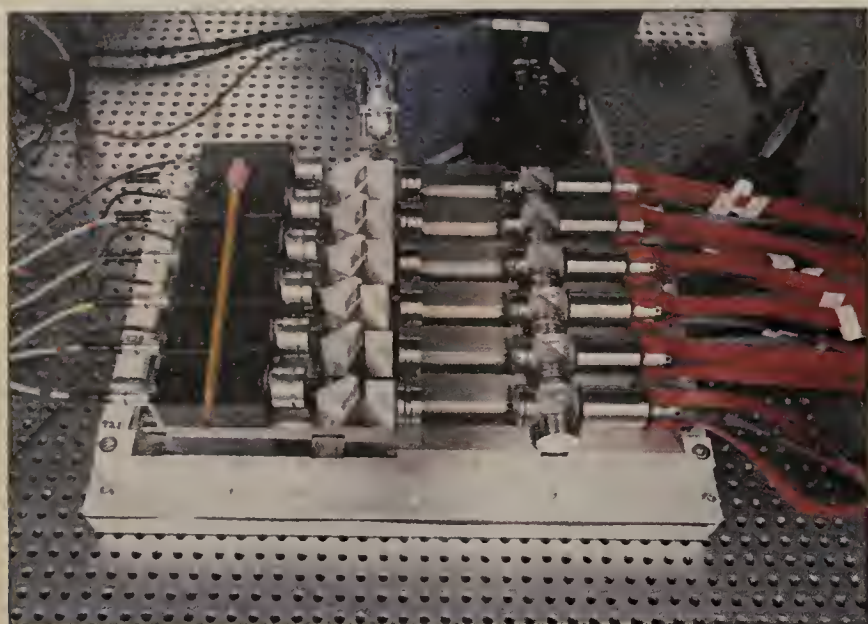
That includes one light source complete with modulating electronics, one receiver and one switch complete with switching and routing software and associated electronics. This adds both cost and complexity to a switching system.

Another promising technique that, similar to WDM, takes advantage of the properties of optical systems is free-space switching. Free-space switching is an attempt to use the imaging ability of optics to provide throughput benefits in the middle of an operating switch, according to Bell Labs' Miller.

Free-space switching attempts to use an aspect of optics that is well known by everyone — seeing a whole picture at once. "We see many channels of information at the same time," he says. "Free-space optics is a way of getting a very large number of channels of information through the switching system."

Free-space optics research at Bell Labs is based on symmetric self-electro-optic effect devices (S-SEED). S-SEEDs, which are made from gallium arsenide, can switch on and off in less than one-billionth of a second when illuminated by a low-power beam of light.

To make optical switches, Bell Labs researchers combine S-SEEDs into arrays, which are sep-



AT&T Bell Laboratories' newest optical switch is based on symmetric self-electro-optic effect devices.

longer believe that this type of device is practical.

"Today, the idea is to use optics to help electrical systems, not beat them," says David Miller, head of the Photonic Switching Device Research Department at Bell Labs.

One problem with an all-optical approach is that if you leave the signal in the form of light all the time, you'll have a tremendous problem with synchronization. For example, if one packet is coming from Chicago and another from San Francisco, they won't arrive in New Jersey at the same time.

"You need to synchronize them, both in terms of their packet framing as well as the clock rate of the individual bits in the packet," Miller says. "You need to resynchronize them before you put them through a switch. I don't see any way that we are going to do that optically."

For the foreseeable future, he says, all resynchronization will have to be done with electronics. So switches will need both optics and electronics.

Approaches emerge

Now that researchers have settled on combining electronics and optics, several distinct areas of optical-switch research have emerged.

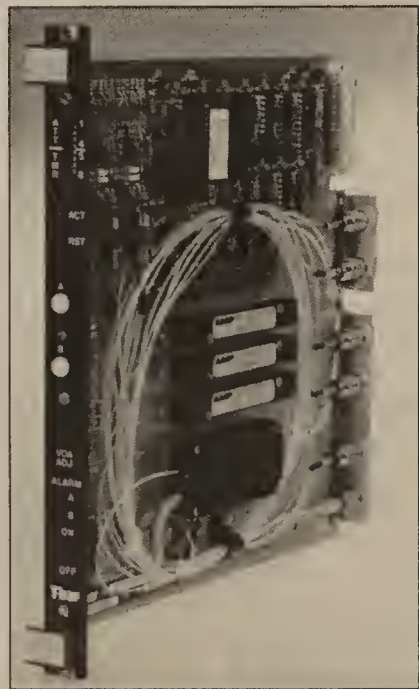
The first category is guided wave switches. Guided wave optics are used to physically reroute channels of photons in much the same way currents of electrons are rerouted when plugging a jack into a patch panel.

Guided wave systems generally are optically transparent, which means that the same photons that enter the switch emerge at the other end. The device does not convert the optical signal to an electrical signal; it simply reroutes the photons.

However, guided wave switches have to be controlled electron-

still need to be made part of the switch and must be based on electronics. The photonics only provide a high-bandwidth channel.

There are advantages and disadvantages to guided wave switches. "If you have something like a video signal — the output of a high-definition TV, for example — and you don't have to worry about controlling the signal, guided wave devices are wonderful," Hinton says. "They have virtually infinite bandwidth. You just send the information through, and it gets to the other side."



Commercially available optical switches usually perform a single task. This one by T-Bar, a division of Data Switch Corp., routes a signal from one fiber to another if the first fiber is incapacitated.

However, if you want to put a packet through the switch and control the packet, then you've got a problem because you can't control the light. "The switch doesn't know when there's a packet there," Hinton says, "so how can it tell when it's supposed to change the route [of the packet] through the network?" The answer: It can't.

This problem with guided

abit switching through a device operating at 150M bit/sec would require 8,000 optical fiber inputs and 8,000 outputs. Bellcore has demonstrated 32-input, 32-output optical Batcher-banyan

and speeds. Using several wavelengths would split this task among several receivers and switches.

WDM switches and receivers would "see" only one wave-

“Today, the idea is to use optics to help electrical systems, not beat them.”

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arated by lenses and optical masks that serve the same function as connective wiring between logic gates in an electronic processor. Each array contains two 10-milliwatt modulated laser diodes whose output is divided into many beams that provide communications between arrays.

"We have spent a fair amount of energy, time and money trying to develop this technology," Miller says. In fact, at Telecom '91 this October in Geneva, Bell Labs will demonstrate a 32-input by 32-output switch that handles 32-bit data (see Photo 1, page 28).

"We've been able to reduce the size of the switch from what we took to Supercomm in 1990, and we reduced the total number of components by an order of magnitude," Hinton says. (For an example of the previous generation switch, see Photo 2, page 28.)

Problems to overcome

A problem all researchers in the optical switching field face is that no one has built these devices yet. "We're poking our way around in the dark with a stick and trying to find the door," Hinton says.

Researchers say they've had to learn a lot about optics itself. The knowledge they've gained so far has allowed them to make the systems smaller. For the next two to three years, their research will probably focus on making the switches faster.

"We haven't spent a lot of time on [the speed of the systems] because we've been more interested in the other problems," he says. "[During the] next few years, there's going to be a focused effort on demonstrating high-performance systems, on trying to make these digital systems work very fast."

This stage of development marks a milestone of sorts. "A lot of the problems in photonics are engineering problems; they are no longer science problems," Hinton says. "When things are science problems, they are like babies. Everybody thinks they're cute and everybody wants to hold them."

"When something turns into an engineering problem, which is the state we are in right now, the technology has turned into a teenager. Teenagers are expensive, frustrating, and you don't know what kind of an adult the teen will grow up to be," he says. Today, many optical switching techniques are in their teenage years.

As the technologies used for optical switches mature, the telephone companies and independent service providers will continue to introduce high-speed services.

For the network manager who needs these services, the best bet is to watch for developments in optical switching. Without such switches, the high-bandwidth services of the future will not be possible. **Z**

Navy supplies Marine gateway

continued from page 13

has made him realize that interconnecting various systems still presents a bit of a guessing game.

Only extensive testing and, most likely, software adjustments will determine which one of the Navy's two installed X.400 gateways will best interoperate with the X.400 software running on the Marines' IBM host.

The Navy now uses both a Retix X.400 application-layer gateway implementation running on an AT&T 3B2 minicomputer and a Sun Microsystems, Inc. application-layer X.400 version running on a Unix workstation.

The gateways, which operate in a dual-stack approach, allow the X.400 application layer of a message to be transmitted to the end user over either TCP/IP or OSI backbones.

In the second phase, scheduled to begin later in the fall, the Navy will install an application-layer gateway for SMTP and X.400 at the Quantico site.

Cooney said the Marines initially have agreed to set up two gateways, although they may expand the system later.

The Navy will also set up an application-layer gateway for the Marines that will perform packet-

by-packet conversion of the OSI File Transfer, Access and Management (FTAM) protocol to the TCP/IP File Transfer Protocol.

Initially, the Navy will implement its own version of an FTAM gateway that was developed by Mitre Corp. The FTAM gateway specifications, written by DCA and Mitre, are now in the public domain.

Cooney said that the Marines will likely purchase an FTAM application-layer gateway product in the future from vendors such as Sun or The Wollongong Group, Inc. **Z**

NSC opens extenders to DASD

continued from page 23

now for NSC's MVS-RDS Version 3.1 software and is offered as a free upgrade.

Hardware-only option

NSC also announced the 7200 Greenline controller, a new channel extender that supports tape drive channel connections over a wide area but uses a hardware-only option that offers significantly less functionality than the software modifications made to the RDS units. Greenline also supports channel connections to Storage Technology Corp.'s Automated Cartridge Systems.

Already here: Some simple optical switches

Sometime in the indefinite future, perhaps a decade or more from now, optical switching will be used in central office switches. But some vendors already offer simple optical switches for use in today's networks.

For example, every device connected to both rings of a network based on the Fiber Distributed Data Interface standard has a simple optical bypass switch.

This simple switch is a physical optical switch, which diverts the optical signal on the ring from one connection to another so that a failed node does not bring down the entire net.

Other commercially available optical switches use a variety of techniques to perform this function.

For example, a switch offered by BT&D Technologies is made of lithium niobate and acts as a guided wave switch. Similar to bending a light beam by passing it through water, such switches route an incoming light beam to different output ports by changing the switch material's physical properties.

Another type of product sim-

ply moves the end of an optical fiber into another position so it completes a new link in a fiber-optic circuit.

T-Bar, a division of Data Switch Corp., offers such a product. The switch uses a piezoelectric device — which converts pressure into an electrical current and vice versa — to physically move a fiber-optic cable from one port to another (see Photo 3, page 28).

The device, called the T-Bar Fiber Optic Variswitch, is used for routing a signal from one fiber to another if the first fiber is incapacitated or if one fiber attached to the device can no longer carry a signal. The switch can transfer the signal to a spare optical fiber in 15 milliseconds.

The T-Bar switch solves a simple problem — such as bypassing a device that's down or rerouting an optical signal in an optical network. Similar to other existing optical switches, it is not designed to handle high switching speeds on many circuits. Rather, the device is an example of many products that promise to be designed to switch signals on an optical net.

— Salvatore Salamone

Book stresses net optimization

continued from page 17

as well as tools for calculating queue lengths, throughput and response times for local- and wide-area data networks.

Sharma then describes algorithms used to design multidrop, directed link and star-configured nets.

He also explains how to use the network design optimization package that he developed, called ECONETS, which runs on personal computers or Apple Computer,

Inc. Macintoshes. The software incorporates algorithms required to design optimal voice and data net topologies.

Finally, Sharma takes the reader through the actual process of designing voice, data and integrated voice/data networks.

Those interested can obtain a free trial copy of ECONETS by sending a 3.5-in. diskette and a self-addressed, stamped envelope to Sharma at P.O. Box 822938, Dallas, Texas 75382, or by calling (214) 691-6790. To order a copy of the book, call (800) 926-2665. **Z**

er, a series of channel extenders that provide point-to-point fiber channel connections at distances of as far as 25 miles. The device is being positioned as a low-end channel extender capable of supporting remote location of printers, plotters, terminal controllers, tape drives and other host-attached equipment. Also, it supports channel rates of up to 4.5M byte/sec.

The 9360 will ship later this month for between \$20,000 and \$41,000.

For further information, contact, NSC at 7600 Boone Ave. North, Minneapolis, Minn. 55428, or call (612) 424-4888. **Z**

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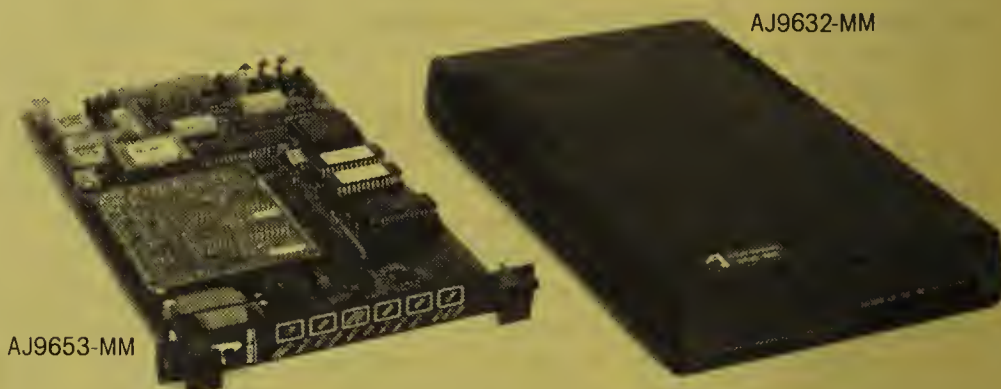
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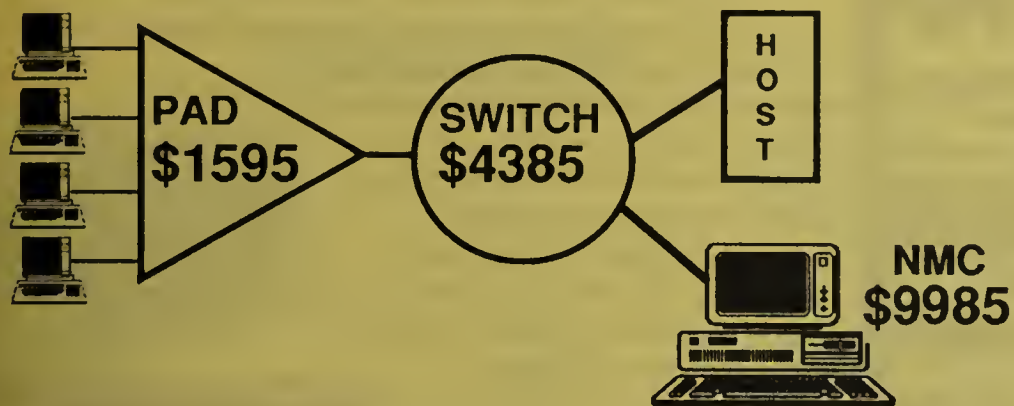
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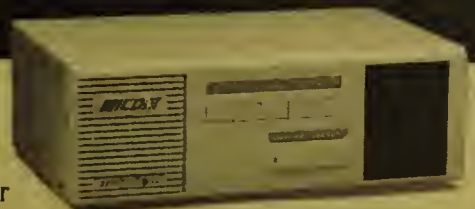
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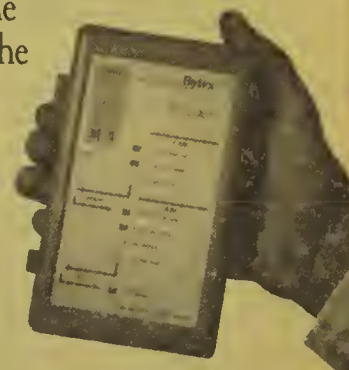
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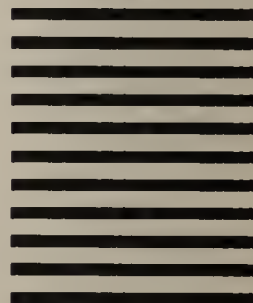
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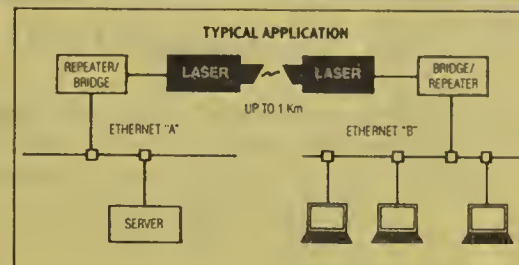
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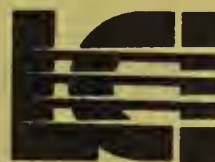
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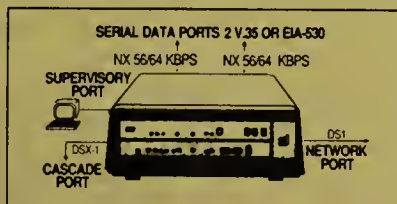
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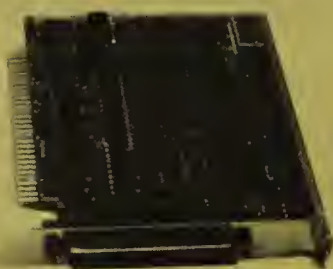
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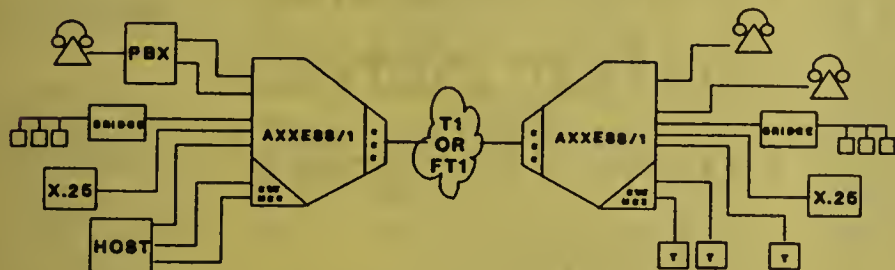
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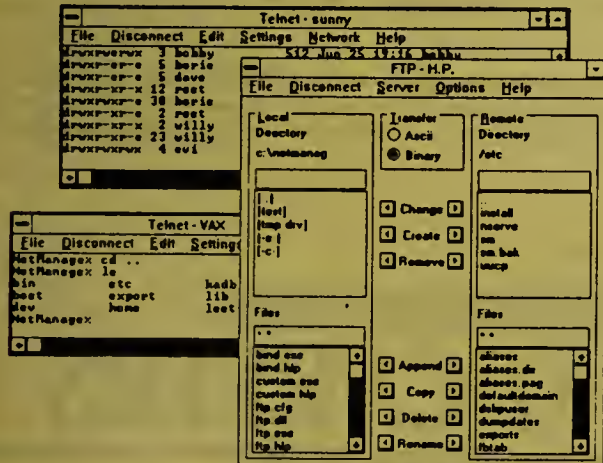
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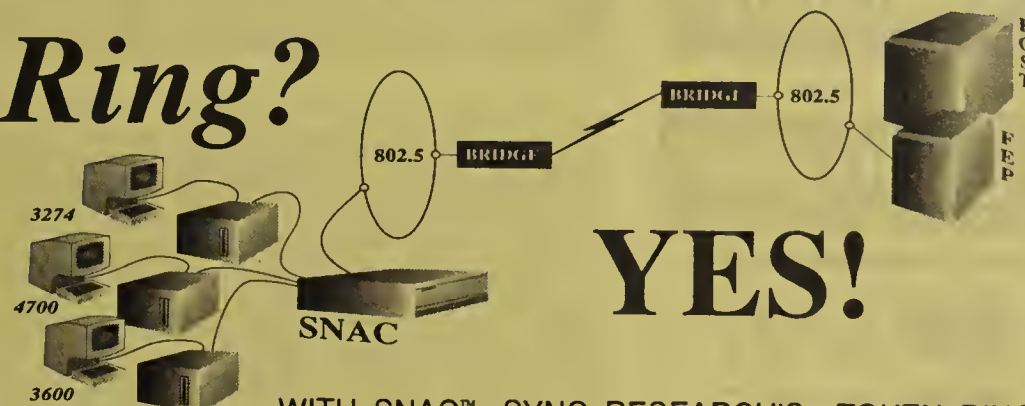
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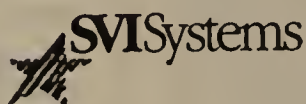
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Newbridge adds tools to line

continued from page 1

separated from a voice net, with responsibility for each given to different administrators.

"I've always been impressed with [Newbridge's] network management capabilities, and this current release builds on that strength," said Jennifer Pigg, senior analyst for data communications at The Yankee Group, a Boston consultancy.

Netrix Corp. has a capability similar to Views in its T-1 multiplexer management system, but analysts said no other T-1 vendor offers the feature.

"Partitioning has been one of these things that everybody has talked about and nobody's been able to figure out how to do," said Jeff Held, a partner at the Ernst & Young consultancy in Vienna, Va. "[Network Equipment Technologies, Inc.] said they were going to do this three years ago."

Jim Michaels, assistant vice-president of network planning for Newbridge, said he expects carriers and other companies to use Views in order to provide outsourcing services. Views would allow companies to partition their own networks by client as well as give clients a workstation from which they could monitor and control their portion of the net.

Views consists of two main software packages. The 4612 is server software that runs alongside the 4602 on a Sun Microsystems, Inc. SPARCstation. It controls the partitioning of the network and provides security features. The 4618 is console software that runs on a Sun SPARCstation, provides a graphical user interface and gives the user control over a designated portion of the network.

The 4612 and 4618 packages replace Newbridge's 4610 and 4615, which were announced about 18 months ago. Those personal computer-based products could partition nets according to particular devices but could not graphically display a logical picture of each subnet.

Views is offered free of charge to 4602 users with software maintenance contracts and comes packaged with new 4602 systems, which are priced between \$10,000 and \$250,000. The 4618 console software will cost about \$18,000.

Newbridge announced a number of products that address packet switching-based applications. All the products work with the MainStreet multiplexer's time-division multiplexer bus to form a packet-over-circuit architecture.

Last week, the firm announced the Frame relay Adaptive Switching and Transport bus (FASTbus) Integral Frame Switch (IFS) Extension, which connects multiple IFS modules in order to provide a larger logical frame relay switch.

Newbridge had previously an-

nounced, but not made generally available, the IFS module, which can read up to 2K frame relay packet/sec and fill a 2.048M bit/sec pipe without delays. It supports up to 30 wide-area data channels.

The FASTbus provides an additional bus that can handle up to 10K packet/sec. That provides enough capacity to fill six T-1 or five E-1 lines without delay, Michaels said. It supports up to 180 wide-area data channels. More IFS modules can be added if additional wide-area channels are required, although the modules would not perform to their maximum capacity without delays.

Users must dedicate a fixed amount of backbone bandwidth to frame relay applications, but there are a number of ways to change that bandwidth. The most dynamic method is to set a trap, using the Simple Network Management Protocol, to detect when utilization exceeds predefined thresholds. If spare bandwidth exists elsewhere in the network, that bandwidth can then be automatically allocated to the IFS modules, Michaels said.

Newbridge also announced the 3604 Multiprotocol FAD, which is a frame relay packet assembler/disassembler (PAD). It supports as many as four asynchronous or synchronous local ports at up to 64K bit/sec each and converts such popular protocols as Synchronous Data Link Control into the frame relay format.

Use of the 3604 promises better bandwidth utilization by obviating the need to dedicate a low-speed, long-distance circuit to each device, such as a cluster controller, Michaels said. Instead, such multiple devices can contend for frame relay bandwidth on a single higher speed channel.

Companies such as Sync Research, Inc. also offer such frame relay PADs.

Also new to Newbridge's family of packet-based products is the 8230 Ethernet Hub, which fits into the 3600 and 3645 MainStreet multiplexers. In its base configuration, the 8230 supports two local LAN ports and two wide-area T-1 or E-1 ports, and includes a LAN bridge. Alternatively, each wide-area port slot can be used to support a 12-port unshielded twisted-pair 10Base-T module, meaning the 8230 can directly support as many as 24 local devices.

Pricing for the packet products has not been finalized, although the IFS will cost about \$10,000 and the 3604 will cost about \$5,000 for a base configuration. The base 8230 product costs \$2,995, and the 10Base-T module costs \$1,700. No pricing was available for the FASTbus.

All the NP4 products, except the FASTbus, are scheduled to ship this fall. The FASTbus will ship in the first quarter of 1992. □

Newbridge airs mux plan

HERNDON, Va. — Along with its slew of new Network Products 4 offerings, Newbridge Networks, Inc. last week provided a glimpse into its next-generation multiplexer, the Synchronous Optical Network (SONET)-based 36150 MainStreet Communications Network Processor.

Newbridge said the 36150 will include both an Asynchronous Transfer Mode (ATM) packet-based bus and a time-division multiplexer bus, enabling it to support both circuit- and packet-based services.

The bus will be based on a SONET switching core with an initial capacity expected to begin at the Optical Carrier (OC)-12 level of 1.244G bit/sec, said Jim Michaels, assistant vice-president of network planning at Newbridge. The bus will be upgradable in increments of OC-12, as opposed to the existing 3600 and 3645 MainStreet multiplexers, which are upgraded in increments of 2.048M bit/sec up to 64M bit/sec.

Many attributes of the 36150 have yet to be finalized, including its maximum bus capacity.

Also, although the switch

will have a maximum of about 128 card slots, which is the same as the 3645, the company has not determined how many high-speed ports each card will support. Michaels said Newbridge will likely offer at least dual T-1, T-3, OC-1 and OC-3 cards for those services, or possibly four-port cards.

Michaels did say Newbridge users will be able to employ their 3600 and 3645 MainStreet interface boards in the 36150.

Also, he said the switch's bus capacity can be divided into any proportion between ATM and circuit-based traffic.

The 36150 will be available in late 1992 at the earliest. Pricing is not final, but Newbridge estimates the product will cost from \$70,000 to \$200,000.

Newbridge also announced that its next generation of resource modules, which perform value-added functions such as voice compression, will be based on Sun Microsystems, Inc. SPARCstation processors. That means independent third parties and users will be able to develop their own resource modules.

— Paul Desmond

Mitel to rebound with PBX line

continued from page 4

Support for those services enables the PBXs to recognize and pass ANI — the telephone number of the calling party — and DNIS — the last four digits of the 800 number dialed — to attached telephone sets.

The heart of the SX-200 Light is the master control unit, a cabinet that houses the Motorola, Inc. 68000-based main processor — or 68020 in the SX-2000 Light — the operating switch software and the common control.

The SX-200 Light houses as many as eight line cards, each of which supports 12 voice/data ports for a maximum of 96 ports per cabinet. Users can link as many as seven 96-port cabinets for a total of 672 ports or 500 lines. Most of the remaining ports are used to support trunks.

The SX-2000 Light houses as many as 12 line cards, each supporting 16 voice/data ports for a maximum of 192 ports per cabinet. The SX-2000 Light can be made up of 11 192-port cabinets for a total of 2,112 ports or 2,000 lines.

Data ports support synchronous communications at speeds up to 64K bit/sec.

The PBXs can be equipped with an ISDN PRI card. Both switches use a single-card T-1 interface, Mitel's Bawcutt said. Both switches use Mitel's Host

Command Interface, a proprietary PBX-to-host software package that establishes a link between the two devices.

Like their predecessors, the SX-200 Light and SX-2000 Light support add-on systems on adjunct processors, including Mitel's VX voice-messaging system, which runs on a personal computer.

Mitel's Call Center Manager, a message center software program, has been enhanced to deliver messages to facsimile machines and pagers. It runs on an IBM Personal Computer AT. The company also improved its ACD Supervision automatic call distributor by enabling it to run on a 80386 Unix X Window platform.

Bawcutt said Mitel will continue to make the SX-200 and SX-2000 but would not say how long the company plans to manufacture those switches. Mitel said the new switches will be available early next year.

Upgrading from an SX-200 to the SX-200 Light or from the SX-2000 to the SX-2000 Light is simple. SX-200 users need only install software Release 1005, while SX-2000 users would install software Release 2006.

However, when upgrading from an SX-200 Light to an SX-2000 Light, users can only retain their applications, phones and fiber. They have to replace their SX-200 Light line cards with the denser SX-2000 Light 2000 cards. □

Wellfleet to offer tools

continued from page 2

der the AIM strategy, the Network Configuration Utility (NCU), which enables administrators at SNMP management stations to configure a large internetwork.

"Current SNMP systems are highly effective for managing multivendor nets. AIM builds upon SNMP with management applications tailored specifically to bridge/routing technology and Wellfleet equipment," said Alan Rosenberg, Wellfleet's product manager of net management.

Rosenberg said AIM was developed in response to a shift in user network management strategies. Many users with large internetworks are replacing vendor-specific management systems with single, SNMP-based, enterprise-wide management systems.

According to Nick Lippis, a principal at Northeast Consulting Resources, Inc. in Boston, Wellfleet's management strategy marries the company's expertise in managing internetworks with the expertise of platform vendors such as HP.

"Wellfleet has a good management strategy because it isn't platform-based. Instead, it provides additional software that adds value to other vendors' platforms to manage Wellfleet products," Lippis said. "They are basically providing a tighter coupling of SNMP-based platforms and their own equipment."

Wellfleet's new NCU application, which works with data fed into the SNMP management station, allows a local-area network administrator to configure or reconfigure a network of bridge/routers from a central location. That reduces the need for remote-site administrators as well as the amount of time required to update or redesign a network.

Moreover, a central management tool such as NCU is important as nets grow in size and complexity.

NCU software can be used to automatically distribute configuration data through its autoconfiguration feature. An intuitive user interface with pop-up windows and point-and-click access prompts the user through a limited number of screens that are needed to define a node and bring it on-line.

To configure an Internet Protocol router, for example, a user enters the IP address, subnet mask and transmit broadcast type. NCU automatically defines all the other information necessary to operate the network using default parameters.

In addition, NCU provides a detailed configuration editor to assist experienced network managers in defining the optional parameters associated with more complex networks.

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NETWORK WORLD

AT&T offers up free ISDN

continued from page 1

shows you to what extent AT&T has to go to get customers for the service."

Under the first promotion, AT&T will waive the \$400 monthly charge on its ISDN PRI service for three months for users that order the service between Sept. 5 and Oct. 20, and request installation no later than Dec. 1.

Under the second promotion, AT&T will waive ISDN PRI's onetime \$3,000 installation charge for users that order it to access AT&T's Software-Defined Data Network (SDDN) 384 or Accunet Switched Digital Service 384 services. Orders must be received between Sept. 5 and Dec. 31, and users must request installation no later than Feb. 15, 1992.

AT&T will waive the \$3,000 charge only if customers begin using SDDN 384 or Accunet Switched Digital Service immediately after the service is installed.

For either promotion, users need not agree to any minimum service period for PRI to cash in on the deals. The ISDN promotions may be used separately or can be combined, provided the requirements are met.

Briere said the promotions should help AT&T add to its installed base of ISDN customers.

"This is great news for users," he said. "Carriers are willing to deal as CPE vendors. Users may even want to wait for better deals."

Users are pleased with AT&T's plans to offer the two ISDN promotions. "It sounds like a great deal," said Ed Hodgson, Schindler Elevator Corp.'s computing

and communications manager and cofounder of the [North American ISDN Users' Forum]. "The promotions should serve the purpose of getting larger users to start using ISDN quicker."

Richard Campbell, AT&T's ISDN and Signaling System 7 product management district manager, claims the carrier has already far exceeded expectations for 1991 ISDN sales. But he would not say how much revenue related to ISDN services AT&T has made this year or divulge the carrier's sales goal for the year.

He said the promotions are an incentive to reduce the cycle time between when a customer approaches AT&T about its ISDN PRI offering and when installation is completed.

AT&T has well over 200 PRI customers and is installing PRI at a pace of two to three locations a day, he said. But it is not the first carrier to offer ISDN promotions.

In July, US Sprint ran a promotion under which it waived the usual \$2,000 installation charge for users that signed up for its PRI service during a promotion period running until the end of this year. The deal requires customers to place their PRI orders by Dec. 31 for line installation by March 31, 1992.

A US Sprint spokeswoman last week said the carrier had 89 PRI lines installed before the promotion began, and now it has 107.

"Some of these are the result of the promotion. Overall, the promotion is working well for us," she said.

MCI has waived its onetime \$3,000 ISDN PRI installation charge since last fall, according to a company spokesman.

AT&T's proposed promotions

are the latest in a series of steps the carrier has taken to make the service more attractive to a broader base of users since it became the first long-haul carrier to launch an ISDN service.

When it introduced ISDN PRI service in April 1988, AT&T charged users a \$3,000 installation fee and a \$400 monthly charge. AT&T also assessed users a onetime \$200 charge and three cents per automatic number identification (ANI) for PRI's Information Forwarding-2 feature. Customers that used PRI's call-by-call service selection feature paid a onetime \$250 installation charge and a \$200 fee each time the access pipe was reconfigured.

But tepid user interest in PRI and pressure from early customers forced AT&T to propose major changes in the way it marketed PRI and its first two features.

In November 1989, AT&T announced plans to increase the number of net entry points by 1990 from 110 to 290, lop off a third of the price for phone numbers delivered with ANI and offer the previously optional call-by-call service selection free with PRI.

Today, PRI is available from 380 U.S. locations, which includes all 114 AT&T 4ESS network switches and 261 other points of presence. PRI can be used to reach more than a dozen countries, including Canada, France, Germany and Japan.

Customers can use PRI to access AT&T's Megacom line of services as well as SDN, SDDN, Accunet Switched Digital Services and its Switched Digital International offering.

The ISDN promotions are to take effect Sept. 5. □

Feds' voice pact controversial

continued from page 4

total international switched voice service charges."

The ISVS RFP also requests bidders to propose how the international service could be used as an emergency backup against FTS 2000 during outages.

"The government has decided that ISVS access must not impact FTS 2000 in any way — neither cost, performance nor service provisioning," the RFP said.

Thomas Wagner, a telecommunications specialist at the General Services Administration's customer requirements office, said ANI had not originally been included as a ubiquitous feature under FTS 2000 due to its cost at the time FTS 2000 was awarded.

ISVS will be awarded to one vendor, although subcontracting will be allowed in order to give smaller U.S. carriers, and foreign ones as well, a piece of the deal.

Wagner said ISVS marks the first time the government has aggregated the bulk of its international voice requirements into one major contract.

"In the past, the civilian people did one thing and the Department of Defense did something else," he said.

Bytex intros RISC switch

continued from page 4

Data Corp., a market research firm in Framingham, Mass.

The Unity 90 has other industry standard components, such as a short Ethernet segment connecting the dual RISC processors and a Unix operating system to control the switch.

Miller said use of such standard off-the-shelf components frees Bytex to spend more time developing new application software for the switch, while the RISC-based processor will supply the power required to run those applications. However, he declined to comment on the applications being developed.

The Unity 90 has the same 4,096-port capacity as the Unity 50. That capacity is a function of the switch's bus capacity, which Bytex has no plans to change at this time, he said.

Existing Unity 50 and older AutoSwitch 1000 and 4000 matrix switches are field-upgradeable to the Unity 90. Upgrades can be accomplished by switching out processor modules and disk drives, which can be accomplished without taking down the switch.

The Unity 90 is scheduled for general availability this month. A Unity 50 upgrade costs \$41,000, and AutoSwitch 1000 or 4000 upgrades both cost \$43,000. Pricing for the new Unity 90 switch starts at \$100,000. □

Wagner said ISVS was planned as a nonmandatory use procurement for the government, meaning agencies could sign up for international voice service at their own discretion. Smaller agencies with less international traffic would benefit most by receiving the same low rates as larger agencies (see chart, page 4).

Wagner added that a contract this large will likely result in carriers filing lower tariffs in order to bid competitively.

AT&T and US Sprint, the incumbent FTS 2000 vendors, could be motivated to complain about the ISVS procurement because it would take traffic off their FTS 2000 networks.

But last week, the two carriers remained mum on the subject. AT&T declined comment, and US Sprint only stated it has not yet decided whether to bid on ISVS. Bids are due by Sept. 23.

According to federal sources, AT&T now has the lion's share — easily 80% or more — of the government's international switched voice service.

Privately, federal sources said the exclusion of FTS 2000 would eliminate the possibility of AT&T and US Sprint subsidizing ISVS through FTS 2000. Instead, the government would like to see the two vendors bid their generally available public net services. □

Net brings sound to silver screen

continued from page 2

from WilTel last year to support electronic mail, file transfers and voice traffic, according to Wayne Wagner, chief engineer at Skywalker Sound.

Soon after that, Wagner realized the circuit could also be used to transmit high-quality audio used in movie sound tracks. Wagner said much of a movie's sound track, including dialogue, is taped after filming is completed. All the sounds are recorded on 40 to 50 large dubbing machines, which are carefully synchronized to create the sound track.

Before the network, actors either had to travel to Skywalker Ranch to make the recording or have another studio perform the work and ship a tape of the recording there.

But Wagner discovered a product developed by Dolby Laboratories, Inc. that makes it possible to transmit high-quality audio across a T-1 line.

Dolby's product compresses and digitizes two audio channels

into a 256K bit/sec data stream, he said.

Now actors in Los Angeles can travel to Skywalker Sound's Santa Monica facility to make the recordings, which are then transmitted via T-1 to Skywalker Ranch, which dubs them into the sound track.

One T-1 line can support 12 channels of high-quality audio, Wagner said.

"This can cut one to two days out of the production cycle, which is significant in the movie industry," he said.

Remote a hit

According to Wagner, the remote capability has drawn so much interest from other studios and movie houses that Skywalker Sound is considering spinning off a business unit to help other companies implement similar audio links.

The company is also considering joining with other movie studios to share a T-1 line to New York. Since many actors live and work in New York, the T-1 link would speed dubbing of replacement dialogue, he said.

The T-1 circuit has also made it easier for editors and film directors to review a movie's sound track. Prior to the T-1, they had to travel to Skywalker Ranch to listen to the sound track and make changes. Now they can watch the movie in the Santa Monica studios while listening to sound being transmitted from Skywalker Ranch.

For example, during post-production of *Backdraft*, director Ron Howard worked from Skywalker Sound's Santa Monica sound theater, where he watched the film and listened to the sound piped from Skywalker Ranch. If he wanted to make a change or hear a different sound mix, he talked to the sound crew over an intercom linked via the T-1.

To make this possible, Skywalker Sound developed a proprietary method for encoding and transmitting synchronization signals over a T-1. This enables the chief production engineer at Skywalker Ranch to operate a projector running in Santa Monica and keep it in sync with sound being transmitted over the T-1, Wagner said. □

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